ANNUAL RATES OF SUBSCRIPTION.

Farmers, Graziers, Horticulturists, and Schools of Arts, **One Shilling.** Members of Agricultural Societies, **Five Shillings,** including postage. General Public, **Ten Shillings,** including postage.

VOL. XL. 1 OCTOBER, 1933. PART

Event and Comment.

Use More Wool.

THAT the wool industry is maintaining the solvency of Australia was t of the speeches at the official opening of the Use More Wool Exh the Brisbane Town Hall.

The Minister for Agriculture (Hon. Frank W. Bulcock) in declarin exhibition open, said it was obvious that a much greater volume of wool coul used in Queensland and Australia. Less than 6 per cent. of the total production o Australian wool was used in the Commonwealth. Research had indicated that clothing made of wool possessed merits far surpassing those of any other material, and that fabrics for house-furnishings made of wool were equally as aesthetic as those made of any other substance.

The appeal to use more wool should be irresistible to those people who considered that Australia should utilise her resources to the full, said Mr. Bulcock. At present the woolgrowers were maintaining the solvency of the Commonwealth.

It was a paradox that Australia, though producing the best wool in the world, was purchasing woollen goods from other countries. In the light of the serious unemployment problem the position was absurd. Unemployment had been greatly aggravated by the low values fixed by foreign buyers for Australian wool. At present, owing to the small local consumption, Australia was able to exercise very little influence on the world's tariff for raw wool.

"I visualise the day that must come, sooner or later, when, instead of exporting our wool, we will manufacture it, and merchants from other parts of the world will be purchasing our finished fabrics," said Mr. Bulcock.

The injunction to use more wool was a wise one. In that way the industry could be expanded, and the foundations laid for greater national security. The creation of a wool consciousness was a very laudable aim.

The exhibition demonstrated that Australians were capable of the same artistry in the manufacture of woollen goods as the people of older countries, he concluded. The products of the Ipswich woollen mills had attained a standard of excellence comparable with that of any other country.

Women and Wool.

WOOL is a primitive necessity, a fact often overlooked in our changing world. Humanity has shifted its relative demands from the prime necessities of life—food, clothing, and housing—towards goods which satisfy secondary and, perhaps, more refined needs. Consumers in general are turning in each category of goods they use, from the coarser to finer qualities. Brown bread has been replaced by white, cereal foods by meat and other animal products, and cottons and woollens by silk and furs.

The wool production of the world to-day is only slightly greater than it was fifteen years ago, but silk has practically doubled, and artificial silk has increased tenfold. It will be seen, therefore, how these changing tastes or fashions have affected the demand for our wool and how greatly that lessened demand has reacted against our great staple industry, the properity of which means so much to us in our export trade.

With world production of all fibres steadily increasing competition is becoming intensified. And what has been the effect of this competition? We all know the amount of substitution that has taken place, how wool has been displaced by artificial fibres in the hosiery industry, how cotton and wool have yielded to silk in the woman's wardrobe.

Intense competition has enabled artificial silk and other manufactured fibres to be placed on more than favourable terms with wool. A study of consumption figures is interesting. Owing to the increased use of furs and silk and other fabrics that women have been wearing in recent years, the annual consumption of wool has markedly decreased. This statement has been challenged, however, by some authorities, but undoubtedly city women are using considerably less wool than formerly. To some extent, men are also using less in ordinary wear, though this is counteracted a big expansion in the demand for such articles as sweaters, golf stockings, and bing togs, due to an increasing interest in outdoor life.

the present situation, the wool industry requires to anticipate developments discovery of ways and means of turning them to advantage. It is essential, mple, to find out through what means the large and steadily increasing consumption of textile fibres is growing. Such research carries one into not without a feeling of trepidation, of current changes in feminine fashions. e remarkable data are met with. Although, for instance, there has been ten and said to the effect that the most serious trouble for the textile came from the trend towards fewer and fewer clothes on the part of close study of the position shows that there is no room for very much n. There is a current revolution in style, that one cannot help noticing in hour stroll down Queen street, which tends to offset this downward trend.

But the most important fact is that, although the average woman's everyday dressing represents but a fraction as many yards of material as her mother's or grandmother's, yet the number of garments in the wardrobe of women of all classes is far greater than those of women of the wealthier classes alone a generation or two ago. Along with lighter and less cumbersome clothing have been lower prices as a result of increasing production. The average woman wears less, and buys more, but, unfortunately, from the wool man's point of view, new synthetic fibres make up much of the additional purchases.

If an opinion may be risked on a subject in which mere man must display some courage in discussing (or is it just foolhardiness?), one of the most important opportunities for the wool industry through aggressive measures lies in intenser development, or extension of a demand for wool in women's wear. A further cultivation of the possibilities of the industry would make woollen materials more attractive from a dressmaking standpoint, but actually more desirable than materials made from the strongly competing fibres.

Wool consumption would increase greatly as the result of such an effort if well directed. It is a matter of style, of course, let alone comfort, but we are afraid style will be considered the more important. One lady of our acquaintance, for example, told us the other day that she would cheerfully wear a sujee bag if it were in the fashion.

As a matter of fact, in Europe wool is now worn much more than formerly, and in Paris woollen fabrics are as chic and smart as those of silk or cotton. French and English women wear much more wool than American women, and there is no reason why Australian women, especially as wool is one of the most important factors in the economy of the Commonwealth and successful wool marketing has become

such a serious matter, should not follow such an excellent example. Any bias against woollen materials is simply an idiosyncrasy. It is utterly indefensible on the grounds of comfort, fashion, or economy. What is required in all these things is careful education in the value, both hygienically and economically, of the home-grown product.

One of the best means of serving Australia at the present time is to wear more wool.

The Cotton Planting Campaign.

THE planting season for cotton in the areas south of Mackay ranges from the end of September to December, with the first half of October as the best period. The later the planting the more danger there is of experiencing attacks of various insect pests. North of Mackay where the lighter rainfall belts exist, the same planting period should also be considered, particularly on the poor soils of the tobacco districts. In the heavier rainfall areas, the best results have been obtained from plantings made in late February. Such sowings develop under a tapering off rainfall, and thus mature their crops in the drier winter months. Plantings should be at the rate of 10 lb. delinted seed for new burns in the scrub; 12 to 15 lb. delinted and 15 to 20 lb. undelinted for the cultivations. Row spacings of 4 feet 6 inches are generally used, and the plants are thinned out when 5 to 6 inches tall to distances of 1 to 2 feet, according to soils and the season. The crops usually require from five to six months from planting before being ready for harvesting, which extends over another three to five months, depending on the climatic conditions. In the crop planting tables, published in our last issue, some obsolete information on the time of sowing and seed requirements was inadvertently included. The foregoing will, however, correct any misunderstanding that may have been conveyed as to cotton crop requirements in Queensland.

CROWN LAND FOR NEW GRAZING SETTLEMENT.

HUGHENDEN DISTRICT.

Hamilton Downs and Manuka Resumptions are to be open for Grazing Homestead Selection at the Land Office, Hughenden, on Thursday, 7th December, 1933, at 11 a.m.

Portion 4, parish of Urania, being an area resumed from the western part of Hamilton Downs Holding, is situated about 48 miles south from Maxwelton Railway Station.

Area is 25,053 acres.

Rent, 1¾d. per acre for first seven years.

Portions 3, parish of Manuka, and 6, parish of Corfield, being the area resumed from the western part of Manuka Holding, are situated on both sides of the Hughenden-Winton Railway between Corfield and Olio Railway Stations.

Areas, 25,294 acres and 23,913 acres, respectively.

Rent, 2d. per acre for first seven years.

Term of lease in each case, twenty-eight years.

Each selection must be stocked with sheep to its reasonable carrying capacity within a period of three years, and proof must be furnished of the financial standing and pastoral or land experience of the applicant.

GOONDIWINDI DISTRICT.

Billa Billa lands are to be opened for Prickly-pear Development Grazing Homestead Selection at the Land Office, Goondiwindi, on Thursday, 23rd November, 1933, at 11 a.m.

Portions 1 and 3, parish of Billa Billa, 4 and 5, parish of Calingunee, 4 and 5, parish of Nomby, and 3, parish of Weir, situated on Yarrill and Billa Billa Creeks, from 18 to 27 miles north of Goondiwindi.

Areas from 11,700 acres to 16,000 acres.

Rent in each case ½d. per acre for first fourteen years.

Each selection must be enclosed with a rabbit-proof and marsupial-proof fence during the first three years, and will be subject to prickly-pear clearing and developmental conditions.

Free lithographs and full particulars of these lands may be obtained from the Land Settlement Inquiry Office, Brisbane, the Land Agents at Hughenden and Goondiwindi, and the Government Intelligence and Tourist Bureau, Sydney.

Bureau of Sugar Experiment Stations.

CANE PEST COMBAT AND CONTROL.

By EDMUND JARVIS.

It is proposed to publish each month a short paper describing the movements of this insect, either above or below ground, according to the time of the year; together with descriptive details of a nature calculated to assist canegrowers in the study of this pest in every stage of its life cycle. Mr. Jarvis's entomological notes are always interesting, and this additional monthly contribution will be welcomed by our readers who are engaged in the sugar industry.—Editor.

GREYBACK COCKCHAFERS LYING IN PUPAL CELLS.

October is the earliest month in which it is possible for a first brood of beetles (primary emergence of the season) to escape from the soil. Such undue appearances, however, rarely happen, two instances only having occurred during the last twenty years. In order to bring about an emergence of this nature, the beetles of the preceding year would need to have taken to wing early in November, and to have assumed the pupal state the following June, under exceptionally favourable climatic conditions.

The life-cycle of the pupa occupies a period of about five weeks, an additional three or four being passed by these beetles in their subterranean pupal chambers. Time is thus afforded for the outer casing of the beetle to become rigid and horny enough to resist contraction of the internal muscles required to operate movements of the powerful legs and wings of the mature cockchafer.

The plate for October shows a little more evidence of movement than was apparent during September, more than 50 per cent. of the beetles having now appeared in their resting cells to complete maturity and await ultimate release when rain has softened the earth overhead. A lately transformed pupa is seen in another chamber, and above that a set carrying cane sticks for next season's crop.

Trap-trees for Beetles.

Amongst the various methods of combating grey-back cane-beetles—that of collecting them from suitable trap-trees—deserves serious consideration, and should in certain cases be practised by individual farmers. On selections, for instance, where these cockchafers habitually invade the cane areas from near-lying belts of forest land, a number of such trees could with advantage be planted on headlands nearest to this timbered country. The best tree to use for this purpose is the well-known "weeping fig," which has recently been found to be most attractive of all the various food-plants of the grey-back, and appears to be specially adapted for such control work. It can be grown from seed, from cuttings, root grafts, or layered twigs; and after reaching a height of about 6 ft., rapidly makes a big tree, being very hardy and well suited to tropical conditions.

These figs could be planted about a quarter of a mile apart, starting from corners of the headlands needing protection. When of suitable size, the heads should be pruned in such manner as to induce a low and spreading growth of convenient height for collecting.

Make Arrangements for Fumigation Work.

During October cane farmers should arrange to secure the services later on of reliable men for carrying out the work of fumigating grub-infested land at the proper time. It is needless to state that the chief qualification for this class of field work is conscientiousness, and such desirable men should never be hurried, but allowed time to do the work to their own satisfaction.

Inspection of Hand-injectors.

Hand-injectors should now be overhauled, and all washers closely examined. It will be found a good plan to cut a number of duplicates of those washers which are liable to give trouble or get out of order when fumigation work is in full swing, and delays caused by such replacements prove inconvenient and mean loss of valuable time. It would be well to have duplicates on hand of washers G. X. S. L. V. (see illustration of section of hand injector published in last month's notes).

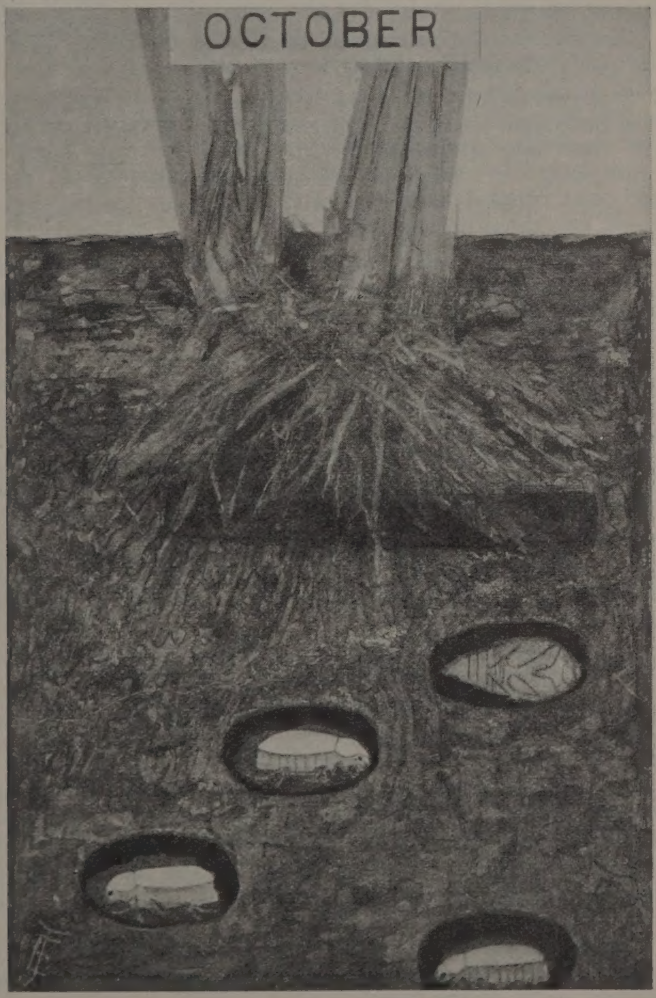

Plate 85.—Greyback Cockchafers in pupal cells waiting for rain to soften the ground and allow them to reach the surface. The fourth cell contains a pupa.

Fruit Fly Control in the Stanthorpe District.

By HUBERT JARVIS, Entomologist.

DURING last season the fruit fly caused very considerable losses in the Stanthorpe district, and it is accordingly absolutely essential that a special effort be made to control this pest during the approaching season, otherwise the district will be faced with the strong probability of further and increasingly serious losses.

All fruitgrowers are therefore strongly urged to loyally support the control campaign, because, in order to achieve the desired satisfactory results, it must have the wholehearted backing of every orchardist in the Granite Belt. Provided the measures advocated in the following paragraphs are adopted and efficiently carried out in every orchard, there should be very little loss from fruit fly.

There are at present only two known methods of proved value for the control of the Queensland fruit fly. These are the gathering and safe disposal of all waste and infested fruit and the trapping of the fruit flies by means of a lure.

Luring.

Individual orchardists have for years obtained excellent results by luring, and what is now required is that all growers in the Stanthorpe district shall lure consistently in order to give this control measure a really fair trial, and thereby prove to themselves what can be accomplished by it.

All growers are accordingly asked to set as many traps as possible, but not less than ten, on 15th October, baiting them with the Jarvis or Harvey lure, and to continue trapping, if possible, throughout the season.

Traps should be rebaited weekly, and if the traps are much soiled they should be cleaned out before rebaiting.

The formula for a five-to-one strength of the Jarvis lure is five tablespoonfuls of liquid household ammonia, five teaspoonfuls of imitation vanilla essence, and twenty-six ounces of water (one wine bottle full). In setting the traps one eggcupful of the lure prepared according to the formula just given should be added to five eggcupfuls of water, and this will give just the right amount of bait for one trap.

Fruit flies are generally found in the wettest or most sheltered portion of an orchard, and they have a fancy for particular trees, in which they congregate. Hence it is incumbent on the grower to find the best trapping trees by shifting the traps about. Large leafy trees are generally the best for trapping, and the traps should always be set in the shadiest parts of the trees.

The traps should be hung by means of tie wire or stout string, and they should hang as level as possible.

Growers should not be discouraged if they do not catch any flies for a week or so. This may be due to the fact that there are no flies about, especially early in the season. Persevere with this control measure, and remember that orchardists in Stanthorpe have fully demonstrated its value in past years, and, furthermore, that luring is an established control measure of proved value in other countries where fruit-fly infestation has to be combated.

Disposal of Waste and Infested Fruit.

It is generally recognised that the gathering and destruction of all waste and infested fruit is of the utmost importance in fruit-fly control. Unless this measure is conscientiously carried out there is little hope of effectively controlling fruit fly.

Hitherto the destruction of waste and infested fruit has usually been accomplished by boiling, burning, burying, or immersing in water. None of these measures have given entire satisfaction, and all involve a great deal of labour. Hence it is now considered that the pit method is the most satisfactory manner in which to dispose of such fruit.

After the fruit is tipped into the pit it quickly commences to ferment, thus killing any fruit-fly maggots that may be present in the fruit.

A convenient size for the pit is about 6 feet by 5 feet, the depth being not less than 20 feet.

A suitable cover should be made for the pit. This can be built of hardwood boards or logs, and in either case an opening about 14 inches square must be left in the centre through which to dump the fruit. Inside this opening there should be nailed a sort of box combing made of hardwood boards 6 inches by 1 inch, and this should project about 4 inches above the cover, forming a sort of hatchway, over which a wooden lid can easily be fitted. If logs are used as a cover or there are spaces between the boards, the cover should be banked over with earth right up to the hatchway or opening. This will make all secure. The pit should be dug somewhere handy to the packing shed, as this will save unnecessary carting.

A pit such as that described will last for years and save no end of worry about disposing of waste and infested fruit. It certainly affords the most satisfactory method of disposing of such fruit.

Summary.

Luring from the middle of October, continued throughout the season, combined with the dumping of waste and infested fruit in a sealed pit, will control the fruit fly. Growers in the Stanthorpe district are, therefore, strongly urged to adopt these control measures, otherwise they will inevitably be faced with a repetition of last year's serious losses.

Two Insect Enemies of Nut Grass.

By W. A. T. SUMMERVILLE, M.Sc., Assistant Entomologist. J.M.R.

ABOUT thirty years ago nut grass (*Cyperus rotundus*) growing in the Singleton district of New South Wales was recorded as being attacked by a species of Coccidæ, the family to which the well known scale insects belong. The insect was credited with inflicting serious injury to its host plant. It was realised that if this were so the Coccid in question might prove of great value as a means of controlling the spread of the "grass," and consideration was given to its introduction to Queensland. Mr. Henry Tryon, then Government Entomologist, drew attention to the possibility of the insect attacking other plants, and advised caution until more was known of its habits. As a result of this warning it was some years before the insect, *Antonina australis* as it was named, was brought to this State, in which it was first liberated in 1910 in the Bundaberg district. Since that time it has been distributed over most of the coastal areas where nut grass occurs in any quantity. It is stated that it was taken as far north as the Herbert River, and Gayndah is the furthest place west at which it has been found.

Owing to the frequency with which nut grass control inquiries are received by the Department and the very different reports as to the effectiveness of its insect enemy, the writer was instructed by the Chief Entomologist, Mr. Robert Veitch, to make observations with a view to determining the value of the Coccid as a means of controlling nut grass, and also to discover if possible whether any plants of economic value are liable to be attacked.

The work was carried out chiefly at Brisbane, Bald Hills, Gatton, and Bundaberg, but observations were also made at such other places as have from time to time been visited in connection with other investigations.

Feeding Habits of the Nut Grass Coccid.

The Coccid feeds entirely by sucking the sap of the host plant, and is subterranean in habits. Its feeding is mainly confined to the nuts, but quite frequently it is found on the ordinary roots and more rarely at the base of the stalk. As will be mentioned later, there is also a species of mealy bug on the "grass" which is found practically always on the base of the stalk.

The amount of injury which the plant sustains varies very greatly and appears to depend entirely on the nature and condition of the soil.

Field Observations on the Coccid.

A colony of the Coccid was established in a rather heavy black soil garden in Brisbane. The plot was not disturbed but was occasionally watered when the surrounding lawns required water. After a little more than twelve months it was found that, though the insect had undoubtedly increased in numbers, the nut grass was very healthy, and had certainly not diminished in quantity.

At Bald Hills two small plots were established about fifteen feet apart on the headland of a cultivation paddock. Here the spread was very slow, and in about nine months some of the nut grass between the plots was quite free from attack. The "grass" throughout continued to thrive. This observation was made during a rather wet season, and the soil was constantly very moist for about the first two of the nine months.

Probably the most conclusive evidence was obtained at Bundaberg. At Pemberton and Rubyana in that district observations were made at places where the Coccid had been present for at least twelve, and probably not less than fifteen, years. In one plot, which for many years had been left untended owing to the presence of the nut grass, there was an abundance of the Coccid, but the nut grass was growing luxuriantly. This was on a heavy red soil which would hold the moisture well. Some few miles from this, where the insect had been working for a period of more than ten years, a cultivated plot was examined. Here the Coccid was healthy and plentiful as also was its host plant. The soil was well worked, but again it was of good moisture-retaining nature. On the side of a hill a few hundred yards away the insect was again located. It appeared to have migrated there without contemplated human assistance. In this case the nut grass was in very poor health, and from all the evidence that could be gathered the Coccid seemed to be responsible to a very large extent. This was again in cultivation, but the soil was much lighter and had less moisture-retaining possibilities.

The facts indicated by these plots were confirmed by observations at other places, notably at Gatton, where on moist soil the "grass" was thriving, while on dry soil the insect appeared to be doing good work.

At Bundaberg a plot was examined a few weeks after some very heavy rain, which had resulted in the ground being covered with water for about twenty-four hours. Just prior to the wet weather a colony of the insect had been obtained from the plot, but after the submergence no living Coccids could be found in the soil. Mr. R. W. Mungomery, Assistant Entomologist of the Bureau of Sugar Experiment Stations, who co-operated in the search, stated that he had previously had a similar experience with another plot.

All the evidence obtained pointed to the fact that the insect does not withstand any great amount of free water in the soil, whilst under ordinary moist conditions in the soil its effectiveness is greatly reduced.

No Host Plants other than Nut Grass.

It is rather peculiar that the optimum conditions for the insect and host plant differ so widely, and it rather suggests that nut grass is not the only or original host of *Antonina australis*. Nut grass, of course, is not a true grass at all but is a sedge belonging, botanically, to the family Cyperaceæ. Search has been made on such other Cyperaceous plants, as have from time to time been found, but so far no trace of the insect has been found on them. Again, it must be remembered that sedges, as a family, are usually found growing under soil conditions which, from the observations recorded above, would be unfavourable to the Coccid.

This and other considerations made the examination of certain plants, more particularly grasses, very necessary. Accordingly a search was made on several species of grass of economic importance; Couch, Rhodes, Buffalo, and Paspalum grasses, and sugar-cane, were examined in many localities. As a result of this search Coccids of the genus *Antonina* were found feeding on Couch and Rhodes grasses and dahlia bulbs. After a thorough examination the writer was not satisfied that these were the same species as the nut grass Coccid, but it was considered that a specialist on this group should be asked to decide the question. Accordingly specimens were sent to the British Museum, but no report has yet been received as to their actual identity, although a preliminary note suggests that the above conclusions are correct.

More recently, Mr. J. Harold Smith, Entomologist, working in North Queensland, has carried out some observations on the subterranean Coccidæ of those parts, and he has now expressed the opinion that *Kuwanina hillii* is the dominant and possibly the only species attacking the nut grass in the North.

Mr. Smith has further collected Coccids of the genus *Antonina* from Kikuyu, Rhodes, Couch, Summer, and Paspalum grasses and *Panicum muticum*. He states that all these appear to him to be of the one species, and it seems possible that they may be conspecific with the specimens mentioned above as having been obtained by the writer from Couch and Rhodes grasses in southern localities.

In the meantime experiments were carried out with a view to discovering whether or not the insects would survive an interchange of host plants. These experiments all gave negative results; that is to say, insects transferred from nut grass to Rhodes and Couch, and *Antonina* from Rhodes and Couch, placed on nut grass all died within a few weeks. However, it would be necessary to repeat and extend this work before arriving at a quite definite conclusion.

Evidence in support of this last result was obtained at Bundaberg. In an untended plot nut grass, Rhodes, Johnston, and Couch grasses and sugar-cane were found growing with their roots in close proximity to each other. The nut grass Coccid had been present in the patch for a number of years, and was infesting the nut grass fairly heavily. All the other species were quite free of the insect.

Nut Grass Mealy Bug.

In addition to *Antonina australis* a species of mealy bug has frequently been found feeding on nut grass. This insect, though somewhat closely related to the *Antonina*, belongs to a different genus. The two insects can be readily distinguished as the adult *Antonina* is legless and rounded in form, while the other is elongate and has well developed legs. In all stages the secretion of the *Antonina* is much the less floury. It may be said that there is no evidence that the mealy bug causes any greater injury to the "grass" than does the other insect. The two species are frequently found on the one plant. Indeed, nut grass growing under roadside trees in Brisbane in only moderately heavy soil was observed to be quite healthy over a period of two years, while heavily infested with both *Antonina* and the mealy bug.

Note on Taxonomy.

It will be noted that no attempt has been made to name the mealy bug. The group of insects to which it belongs really requires a specialised knowledge, and so many differences of opinion occur among non-specialists and even specialists in the group with respect to identifications that it might be unwise to make an attempt. The vernacular name should suffice for the purposes of this article, particularly as the insect is not considered to be of any economic moment. For similar reasons the name *Antonina australis* has been followed, though, from some of the available literature, there seems a probability that this insect has been placed in the wrong genus. It can, however, be definitely stated that the insect is the one commonly referred to under this name. It is quite possible that the northern species determined by Mr. Smith as *Kuwanina hillii* Laing and the southern species referred to above as being doubtfully *Antonia australis* Green will be found on examination by specialists to be conspecific.

Summary.

From the above data and evidence gathered from time to time by more general observations, it is considered that except under dry soil conditions *Antonina* has little if any value in controlling nut grass. The damage suffered by the "grass" is greatest in dry loose soils. Under such conditions the insect, especially if undisturbed, may be very detrimental to the health of the plant and thus considerably reduce or even prevent its spread. However, it is very doubtful indeed that *Antonina* alone would ever lead to the eradication of the pest. Cultivation has probably no effect on the insect, except in so far as it alters the moisture holding capacity of the soil, but certainly does help to promote the growth and spread of the "grass." If the plant be growing in a heavy soil under moist conditions, the insect has no controlling influence whatever.

Thus *Antonina* cannot be considered to be of any economic value, since its only really good work is accomplished in situations where nut grass would scarcely ever become a pest to the farmer. In so far as other host plants are concerned, the evidence is reassuring, but must not be taken as definite.

There is also no reason for thinking that the mealy bug is likely to be a limiting factor in the incidence or spread of the host plant.

TO SUBSCRIBERS—IMPORTANT.

Several subscriptions have been received recently under cover of unsigned letters. Obviously, in the circumstances, it is impossible to send the Journal to the subscribers concerned.

It is most important that every subscriber's name and address should be written plainly, preferably in block letters, in order to avoid mistakes in addresses and delay in despatch.

The Tobacco Beetle.*

By J. HAROLD SMITH, M.Sc., N.D.A., Entomologist.

THE entomological difficulties of the tobacco grower do not cease even when the leaf is bulked. Often the stored leaf is invaded by the tobacco beetle and the larvæ of the insect may effect a good deal of damage before the loss is detected and appropriate remedies applied.

The tobacco beetle, *Lasioderma serricorne* F., is a small hard-bodied insect, about one-tenth of an inch in length. The adults themselves are not particularly injurious, but the immature stages feed ravenously on the cured leaf. They are better known as pests of manufactured tobaccos, cigars, cigarettes, &c., but the grower is more concerned with their activity in bulked leaf held on the farm prior to its being sold. All stages occur in the bulks (Plate 86), eggs being laid on the leaf, larvæ burrowing amongst it, and pupation taking place in the debris which accumulates wherever the larvæ are active. Usually the pupæ are attached to a leaf surface enclosed in a cell, the walls of which are impregnated with leaf fragments and debris.

The life cycle requires some six to ten weeks for its completion, but the fertility rate is such that, if bulks are held on the farm for any length of time the injury may be extensive. Normally the leaf is sold within a few months of the completion of curing, but on most farms a certain amount is held over until the following year. This residual leaf may be a temporarily unsaleable variety for which the grower ultimately hopes to find a market. In North Queensland, the carry-over leaf comes from another source. In almost all bulks prior to grading there is some green leaf which is of no value to the manufacturer. The objectionable colour may often be removed by steam treatment, but in current practice it is usual to bulk these "greens" independently, for after a time the colour disappears and is replaced by a saleable mahogany. Such bulks of green leaf are stored in the shed until the following season, when they will be sold along with the new crop. In the meantime, they often become infested with the tobacco beetle, and when the newly-cured leaf is bulked in the same shed the adults rapidly invade the further accessible food supplies, and may cause a great deal of loss even in the limited period between the curing and the sale of the leaf. Outbreaks in the present season have invariably been traced to this source.

The control measures combine both preventive and remedial measures. As infestation in new bulks is initiated by insects in carry-over leaf, it is imperative that any one season's bulks should not be built in the same shed as older contaminated leaf. If the leaf taken from the flue-curing barn is bulked immediately in a perfectly clean shed, the risk of infestation is slight, at least, in the limited period before despatch to the manufacturer. If there is any doubt concerning the cleanliness of the bulk shed some form of fumigation should be carried out before

* Reprinted from "Tobacco Growing in Queensland," by N. A. R. Pollock, J. Harold Smith, and L. F. Mandelson. Published by the Department of Agriculture and Stock, Brisbane, 18th May, 1933.

Plate 86.—The Tobacco Beetle (*Lasioderma serricorne* F.).
Damage to tobacco leaf.

introducing new leaf. Bulk sheds usually lend themselves to fumigation for they are compactly built and easily made airtight. All crevices should be packed with rags or some such material, and the building fumigated with carbon bisulphide. Carbon bisulphide is used at the rate of 5 lb. per 1,000 cubic feet, the fluid being poured into saucers previously placed high up in the bulk shed. This fumigant is inflammable and naked lights should not, therefore, be exposed in the vicinity of the sheds. Furthermore, the operator should take adequate precautions to avoid inhaling the vapour, as this fumigant is toxic to human beings. About thirty-six hours must elapse before the doors and windows are thrown open to allow the escape of the poisonous fumes.

When bulks are actually infested, drastic measures may be necessary to destroy the insects. The reactions of the tobacco beetle to heat have been studied in other countries, and it appears that temperatures of 140 to 150 degrees Fahr. are fatal to all stages of the insect if maintained for two hours. With the heating facilities available on the farm, the grower can thus rid his bulks of the pest. Infested bulks are broken down and the leaf transferred to an empty flue-curing barn. The fires are lit and the barn temperatures raised to 150 degrees Fahr. and kept at that level for two or three hours. If the bulks are thoroughly broken down the shorter period will be sufficient, but if only partly broken the three-hour treatment is preferable, as it allows time for the heat to penetrate the whole of the leaf. All the leaf in the contaminated bulk shed, even though some of it may not appear to be infested, should be treated, for some insects are almost certain to be present in the apparently free stocks. After being heated in the barn, the leaf should not be transferred to the original bulk shed until the building has been fumigated, otherwise any insects remaining after the first removal of the bulks will reinfest the leaf.

GOOD MEN PASS.

In his annual report to Parliament, the Public Service Commissioner, Mr. J. D. Story, I.S.O., pays this graceful tribute to the memory of two notable public servants who passed hence in the course of the year:—

Alfred Halliwell Smith and George Andrew Ferguson passed with dramatic suddenness. Two good men are gone, and their loss is the more acutely felt as both were in the offing for even higher positions. Public Service administration takes unusually heavy toll just now. Apart from the stress and strain of the work, sensitive souls wince under present-day biting criticism—much of it baseless. Mr. Smith was a member of the new Bureau of Industry, and he gave promise of being one of its outstanding men. A meeting of one of the Bureau Committees was held shortly after his death. He had intended to submit certain proposals to that meeting. The proposals were good and had been prepared with that meticulous care and thoroughness characteristic of his work; it devolved upon another to present them. But the dead spoke, and the void was but intensified. Of George Ferguson, Anzac, it can be said that his memory will be cherished by many a widow, many a fatherless waif, and many a returned man—a tribute to his work and his worth which rings true.

The Tomato "Green Fly" Association.

By D. O. ATHERTON, B.Sc., Assistant Entomologist.

IT would appear from previous records that the two species of this association always occur together on tomatoes, though the Jassid, *Empoasca sp.*, greatly outnumbers the Capsid, *Cyrtopeltis tenuis* Reut. This was confirmed in the winter of 1931, and the dominance of the Jassid clearly demonstrated. In the early part of the season at the end of April and during the month of May, considerable difficulty was experienced in locating the Capsid in the field, even when the Jassid was very much in evidence. As the season advanced the Capsid population steadily increased until at the end of September and during October numbers were present on all plants examined throughout the Bowen area. Owing to the fact that both the Jassid and Capsid almost invariably occur together on tomato plants in the Bowen district, a local practice of referring to them collectively as the "green fly" association has arisen.

Nature of Injury.

Direct injury by the Jassid is practically confined to the leaf laminæ, though the fruit may be attacked occasionally. Indirect injury consists in the spotting of the fruit with excreta, and the blemishes thus formed must be removed by the use of a damp cloth before the fruit is shipped. Injury to the leaf results from the feeding habits of the Jassid, as the sap is drawn from a tiny roughly circular patch of the leaf lamina at each insertion of the proboscis. After a short time these areas dry out and become whitish in colour. The punctures are usually made in irregular double rows, but when the leaves are heavily infested all the chlorophyll, with the exception of that in close approximation to the midrib and main veins, may be destroyed. Leaves in the centre of the plant are normally more heavily infested than those towards the outside of the plant. In cases of severe injury the pest thus prevents elaboration of plant food in the leaves, and produces an unhealthy and distorted development which may result in the death of the plant.

In connection with the disintegration of chlorophyll in a small area of the lamina around the site of proboscis insertion, it is interesting to note that in a paper published in 1931 K. M. Smith cites various injuries caused by the feeding of certain Hemiptera or plant bugs. He raises the question of toxicity in salivary secretions of various plant bugs with respect to the tissue of their host plants; states that the saliva of Capsid bugs is generally remarkably toxic to plants; and gives this as one reason in his opinion why Capsids as a group are so little concerned with the transmission of virus diseases. Jassids are more commonly vectors of virus diseases, so that the dead white areas around their feeding punctures on tomatoes are possibly due to death from dessication or general mechanical injury rather than a direct chemical effect of the salivary secretions.

The feeding of the Capsid is apparently confined to the young growing shoots and fruit. The exact mode of attack has not yet been determined, but nymphs and adults have fed and lived for a week under observation on a leafless fruiting branch where the fruit were not in excess of 3/16 of an inch in diameter, and also have been successfully maintained on a young growing shoot which bore no fertilised flowers. All attempts to maintain nymphs and adults on the laminæ of matured leaves in the laboratory have failed, whereas all laboratory breeding of the Jassid was carried out in small moist chambers containing only mature leaves as food.

From these observations it is considered that the Jassid alone is responsible for the part played by the "green fly" association in the large vitality loss and "wragging out" of the central leaves from affected plants. Whether the Capsid may be associated with the phenomenon locally known as "blossom drop" still requires demonstration. The year 1931 was abnormal in that the Jassid was present in considerably greater numbers than usual, whereas the Capsid was less abundant. Therefore, it is just possible that subsequent investigations will not confirm the supreme importance of the Jassid in the "green fly" association indicated by the observations discussed herein.

THE CAPSID.

The results from life history studies with this species, *Crytopeltis tenuis* Reut., were very disappointing, but are contained in the following meagre notes. Gravid females on dissection yielded from six to eight eggs per individual, but no eggs definitely attributable to the Capsid were collected in the field. The site of oviposition on the tomato plant has not been determined. Last-stage nymphs, when confined in the laboratory, lived up to four days before moulting to the adult stage. Adults when confined with adult Jassids have been observed feeding on the latter, which afterwards succumbed. This may have been an abnormal occurrence owing to the enforced proximity of the species in the laboratory. There is no evidence of the Capsid preying on the Jassid in the field.

THE JASSID.

This species, *Empoasca sp.*, is considered more important as a pest than the Capsid, and accordingly has been treated in much greater detail.

During the existence of the temporary entomological station at Bowen from April to October, 1931, the Jassid was observed to breed continuously, but the numbers of individuals fluctuated considerably over this period. In April and early May, at the commencement of the season, these numbers were relatively low, but as the season progressed the degree of infestation increased until it reached a maximum during the latter part of July and throughout August. Following the maximum infestation there was a gradual decline of the Jassid population till the end of October, when observations ceased. A consideration of the major seasonal fluctuations of the tomato crop in conjunction with the foregoing statements will show that, accepting the district as an entity, there may be a positive correlation between the numbers of tomatoes produced and the numbers of Jassids present. This has the appearance of a paradoxical possibility, but nevertheless it probably rests on the fact that the greater the number of healthy well-grown plants—i.e., those producing quantities of marketable fruit—the greater will be the supportable Jassid population.

Life History Stages.

The observations on life history were confined to a period extending from the latter part of May until the early part of August, 1931, and all figures necessarily refer to this period. At the conclusion of incubation, which may have lasted from ten days to a fortnight, the nymph forces its way out of the egg presumably through the incision in the leaf epidermis made by the female for the purpose of oviposition. The time occupied in emergence is fairly constant at ten minutes, and the nymph remains quiescent for a period ranging from five minutes to over half an hour before feeding commences. Newly hatched nymphs are, with the exception of dark red eyes, almost colourless or translucent, but before the end of the first instar they assume a light green colour which then persists throughout the five nymphal instars and the adult life of the insect. Except for a short time prior to each moult, active feeding continues throughout life. Observation indicates that those nymphs destined to produce females are slightly larger and pass more time in the nymphal stages than those from which males arise. For ten individuals bred through the nymphal stages in June, the average time passed as nymphs was little more than sixteen days, whereas for eight individuals reaching maturity towards the end of July the corresponding period was twenty days (Table I.). These notes indicate that the rate of development may be to some extent dependent on climatic conditions or more especially on prevailing temperatures.

The egg is approximately 0·8 mm. in length and about one-quarter of that in diameter. It is sausage shaped and is white in colour with a smooth shining chorion, but towards the close of the incubation period the red eye spots of the developing embryo become visible. The duration of the egg stage is from ten to fourteen days.

The first-stage nymph is about 0·8 mm. in length and almost colourless or translucent at first except for the red eyes, but towards the close of the instar it assumes a light green tinge. The habit of leaping, from which the popular name of "plant hoppers" is derived, is acquired within three hours of hatching, when the young insect is capable of jumping up to 2 inches into the air, about sixty times its own length. The duration of the first nymphal stage is from three to six days.

The second-stage nymph is about 1·2 mm. long with the colour as in the final stages of the previous instar. The wing buds have not yet appeared. The duration of the second nymphal stage is from two to five days.

The third-stage nymph is about 1·6 mm. in length, the eyes are red, and the remainder of the body a uniform light green colour. The wing buds are just evident as posterior lateral extensions of the meso- and meta-thoracic tergites. The duration of this stage is from one to five days.

The fourth stage nymph is about 2·2 mm. in length and coloured similarly to the previous stage, and there is a further development of the wing buds. The duration of the fourth nymphal stage is from two to four days.

The fifth-stage nymph is about 3·0 mm. in length, and except for the red eyes is uniformly light green in colour as are the previous instars. The wing buds are well developed and quite obvious outgrowths from the thorax. Feeding generally ceases some hours at least before the occurrence of the final moult. The duration of the fifth and final nymphal stage is from two to seven days.

Oviposition.

A period of eleven to sixteen days passes after the female reaches maturity before the first eggs are laid. As far as can be deduced from the evidence collected during periodical dissections of gravid females, it would appear that from four to six eggs are matured at a time, but no indication of the total number of eggs laid during the life of the insect has been obtained. Occasionally oviposition takes place in tender slender growing stems, but eggs are far more generally laid in the leaves of the plant, often in the leaf stalk of the compound leaf or more usually in the veins and midrib of the leaflets, but they have never been found in the laminæ of leaves. Female genitalia are so modified that the egg is generally inserted into the tissues of the plant almost at right angles to the surface. After insertion the egg is completely covered by the epidermis of the leaf, and visible external evidence of its position is slight or absent. One observed female in the laboratory continued to lay eggs at intervals for over three weeks.

Duration of Adult Life.

Several individuals lived as adults in the laboratory for a little over one month, and in one instance the total length of adult life was found to be six weeks.

Varietal Susceptibility.

It is fairly generally accepted among growers that Bowen Buck-eye is more susceptible to the attacks of "green fly" than other varieties. This opinion is supported by field observations, during which it was generally found that Buck-eye plants growing in close proximity to those of other varieties carried much larger Jassid populations than the latter.

Further evidence in support of varietal susceptibility was obtained from a small laboratory trial described in a subsequent paragraph.

Two hypotheses have been advanced in an attempt to explain the above-mentioned susceptibility:—

I. Migration occurs between tomato plants in the field and between these and alternative weed host plants. Buck-eye, being more suited to the requirements of the Jassid, accumulates the greatest population per unit of foliage.

II. There is little migration, but multiplication is faster on Buck-eye than elsewhere.

Laboratory trials tended to show that the majority of adult Jassids when placed on Marglobe foliage migrated to that of Buck-eye, even when both were kept under equivalent conditions of moisture, temperature, and light. They also demonstrated that there is no appreciable difference in the total length of nymphal life irrespective of the variety used for food during breeding operations.

Thus it will be seen that there is no support for the second hypothesis, but the data just quoted indicates the probability of the first being correct.

Other Host Plants.

This pest has been found to possess a very wide range of food plants, its alternative hosts embracing a number of orders, including Gramineæ. In fact, it appears that almost all plants of a herbaceous nature may serve as food for this omnivorous feeder. The following are plants on which all stages from egg to adult have been obtained:—Pigweed (*Portulacca spp.*); tar vine (*Boerhaavia diffusa*); beetroot (*Beta vulgaris*); carrot (*Daucus carota*); French bean (*Phaseolus vulgaris*); garden pea (*Pisum sativum*); tobacco (*Nicotiana tabacum*); potato (*Solanum tuberosum*); egg plant (*S. melongena*); night shade (*S. nigrum*).

Adults have also been collected from the following plants, which showed typical feeding punctures:—Wild spinach (*Amaranthus viridus*); cabbage (*Brassica oleracea*); lettuce (*Lactuca sativa*); sow thistle (*Sonchus oleraceus*); false mallow (*Malvastrum tricuspidatum*); star burr (*Acanthospermum hispidium*); sida retusa (*Sida cordifolia*); peanut (*Arachis hypogœa*); sorghum (*Sorghum vulgare*); maize (*Zea mais*); summer grass (*Panicum sanguinale*).

Distribution.

The species is found in almost every agricultural area of the State, and in isolated years has been recorded as causing severe damage to tomatoes at Stanthorpe and to cotton in the Burnett on certain classes of soils. During normal years, however, the severity of its attacks in other districts rarely approaches that which it assumes on the tomato crops at Bowen.

Even in the adjacent districts of Proserpine and Ayr, though present on tomatoes and other crops, "green fly" seldom if ever reaches pest proportions, and even at Bowen there is neither seasonal nor regional regularity of infestation. These observations indicate considerable complexity in the factors which influence its incidence and present an interesting field of inquiry.

Natural Enemies.

The evidence obtained during 1931 indicates two species of egg parasites as the only direct natural controls of any importance. The Mymarid parasite, *Anagrus armatus* Ashm. var. *australiensis* Gir., was comparatively rare, only seven individuals having been obtained from the many hundred Jassid eggs handled. The Trichogrammatid, *Aphelinoidea howardii* Gir., was much more plentiful, and a considerable number were obtained. One record shows that fifty-two Jassid nymphs and twenty three parasites came from the one lot of material, and thus indicates a 30 per cent. parasitism, if it is assumed that each egg produced either a nymph or a parasite. Despite this occasional heavy incidence of the parasite, its beneficial effects in the field were not apparent, and the Jassid infestation increased even in the locality from which the above-mentioned material was collected.

Irrigation.

The observed effects of irrigation are sometimes remarkable and are worthy of more detailed consideration than has been possible in the

investigations at present under discussion. Tomatoes which have been planted early in the season usually decline rapidly under the combined effects of "green fly" and Fusarium wilt when irrigated at the bearing stage. On the other hand, tomatoes planted late in the season and irrigated regularly attain a luxuriant and prolific growth. Such plants appear more resistant to Fusarium wilt, and are able to support a very considerable Jassid population without evident deterioration for a number of weeks after harvesting begins. These observations were frequently verified by the experience of growers throughout the district.

Control Experiments.

In a paper by De Long published in 1929, copper salts are claimed to be toxic when applied to the potato leaf hopper through the medium of Bordeaux mixture treated foliage, and experiments in support of the claim are described. Burgundy mixture is also listed as having this toxic property when applied in a similar manner.

Experiments with Burgundy mixture for the control of the Jassid under discussion were therefore initiated at Bowen, and an attempt was made to gather evidence on the subject. Burgundy mixture was used in preference to Bordeaux mixture because of the difficulty experienced in obtaining a standard quality of lime for the latter.

A block of fifty tomato plants in close proximity to large numbers of others was treated regularly every fortnight for two months with 4:5¼:40 Burgundy mixture. The effect on the plants, judging solely from field observations, tended to be deleterious rather than beneficial. The foliage was less luxuriant and harsher, and there was less fruit than in the case of unsprayed plants. There was no apparent effect on the Jassid, as normal feeding and reproduction continued throughout the period. For the purpose of making a supplementary test a leaf was well covered with newly made Burgundy mixture and confined in a glass tube 8 inches long by 2 inches in diameter. One end of the tube was closed with gauze, and the other, after the introduction of thirteen Jassids, closed by cotton-wool around the leaf petiole making connection with the living plant. At the expiration of five days examination disclosed no dead Jassids.

From these observations it would appear that Burgundy mixture has little insecticidal value against the Jassid on tomatoes, but the definite claims for Bordeaux mixture against a similar pest on potatoes warrant further investigation into this aspect of tomato pest control.

Dusting trials were initiated in April, 1931, and operations commenced with the selection of two experimental areas. One was set out in randomised plots for the accurate comparison of nicodust and ground sulphur as insecticides against the "green fly." The other was marked off into observation plots to roughly demonstrate the mass effects of certain treatments on the "green fly" population, on the general vigour, and on the fruit production of the plants. The treatments used were Burgundy mixture as a spray, and precipitated sulphur, ground sulphur, and nicodust applied as dusts.

The area set out in randomised plots comprised one acre of fairly uniform land, and was divided into nine plots of two rows each, the various plots being separated from each other by an untreated guard

row. The plots were taken in three groups of three each, thus giving three random replications of each of the three following treatments:—sulphur and nicodust applied as dusts.

The dusts were applied at fortnightly intervals from 30th April till 28th May, inclusive. On alternative weeks the whole of the area was dusted with 50 per cent. lead arsenate till 7th June. It was intended to continue these treatments for two months or until such time as the plots became unprofitable to pick. However, the climatic conditions became so unfavourable that the prospects of harvesting a crop completely disappeared, and after one month the collection of further data from the area was abandoned.

The area selected for observation plots comprised about half an acre of fairly uniform land, containing five rows with fifty plants per row. The area was divided into five successive plots, each containing a block of fifty plants, and the respective treatments allotted as follows:—Control, Burgundy mixture, precipitated sulphur, ground sulphur, and nicodust—the Burgundy mixture applied as a spray and the others as dusts. Applications were made at fortnightly intervals from 30th April till 9th July, inclusive, and on alternate weeks the whole area was dusted with 50 per cent. lead arsenate. Unfortunately, these plots suffered from the same unfavourable climatic conditions as those responsible for the failure of the other experiment, and although the treatments were continued for six weeks the collection of data was discontinued thereafter.

Summary.

Previous observations on the invariable association of the Jassid, *Empoasca* sp., and the Capsid, *Cyrtopeltis tenuis* Ruet., are confirmed. The mode of injury of the former is described and discussed, and it is considered that this species alone is responsible for the part played by insects in the large vitality loss and "wragging out" of the central leaves of the plants attacked. The theory that *C. tenuis* may be associated with the phenomenon locally known as "blossom drop" is advanced, but still requires demonstration.

Little information is available from the studies intended to elucidate the life history of the Capsid, but the life history of the Jassid is described in some detail. The theory that there may be some difference in varietal susceptibility of tomatoes with respect to the Jassid is supported by field observations and by a small laboratory trial. Alternative hosts are listed, and mention is made of the distribution and natural enemies of the Jassid.

Reference is made to the claim that copper salts, applied through the media of Bordeaux or Burgundy mixture and other fungicides, are toxic to leaf hoppers feeding on treated plants, and unsuccessful efforts to corroborate this claim are recorded. Control experiments with nicodust, ground sulphur, and precipitated sulphur, designed by Mr. J. Harold Smith, are described.

LITERATURE.

Smith, K. M. (1931).—"Biological Reviews," Vol. VI., Pt. 3.

De Long, D. M. (1929).—"The Role of Bordeaux Mixture as a Leafhopper Insecticide." Jour. Econ. Ento., Vol. 22, pp. 345-353.

TABLE I.

Life History of Jassid.

Date Eggs Laid.	Days—Duration of Egg and Nymphal Stages.							Sex.
	Egg.	I.	II.	III.	IV.	V.	Nymphal Total.	
11 May, 1931 ..	10	4	3	2	2	6	17	♀
	10	4	3	2	3	5	17	♂
16 May, 1931 ..	10	3	2	1	4	4	14	♂
	10	5	3	2	3	3	16	♂
19 May, 1931 ..	10	5	3	2	3	3	16	♂
	10	5	3	2	3	4	17	♀
	10	5	2	3	3	4	17	♀
	10	5	2	5	3	2	17	♀
	10	4	3	3	2	4	16	♂
	10	4	4	2	2	4	16	♂
June average ..	10	4·4	2·8	2·4	2·8	3·9	16·3	
20th June, 1931 ..	10	3	2	4	3	7	19	♂
	10	3	5	4	4	5	21	♀
	10	3	2	4	2	5	16	♂
26th June, 1931 ..	12	4	4	3	3	6	20	♀
	12	6	5	2	2	5	20	♂
	12	5	5	3	4	5	22	♂
	12	5	4	3	3	6	21	♀
	12	5	3	4	4	5	21	♂
July average ..	11·25	4·25	3·75	3·38	3·12	5·5	20	

Note.—June, total nymphal life of male averages .. .. .. 15·8 days
June, total nymphal life of female averages .. .. 17·0 days
July, total nymphal life of male averages .. .. .. 19·6 days
July, total nymphal life of female averages .. .. 20·66 days

MUSTARD IN VETERINARY PRACTICE.

The circumstances in which mustard can be used in veterinary practice are essentially similar to those arising in human beings.

In the relief of local pain the mustard poultice or plaster is invaluable. The size of the poultice naturally depends on the size of the animal for which it is intended and also the area of the body affected. The poultice is prepared by making the mustard into a thin paste with lukewarm water. It is applied to the affected area and it should be left for a period of time depending on the intensity of the pain. No poultice, however, should be left on for more than twenty minutes. In addition to the pains caused by muscular stiffness, &c., such pains as flatulent colic can be relieved by the application of a mustard poultice at the site of the pain.

In preparing a mustard poultice or bath, boiling water or water above 140 deg. Fahr. should not be added directly to the mustard owing to the fact that the enzyme myrosin would be inactivated. Where a really hot poultice is required it is best to mix the mustard with a little cold or lukewarm water and allow to stand for a few minutes to enable the volatile oil to be liberated. Boiling water can then be added if desired. It is not desirable to apply a mustard poultice to broken skin. If a poultice made from mustard alone is too strong, it can be made less potent by mixing it with linseed meal or with flour.

Beef Cattle at the Brisbane Show.

[Blocks by Courtesy of the Graziers' Review, Qld.]

PLATE 87.

Winners of the P. and O. prize for the pen of six bullocks. Exhibited by Messrs. I. J. and M. S. Moore, of Barambah, Goomeri, and purchased by T. Playfair Ltd., of Sydney.

PLATE 88.

Balcomba Ramrod 200th, Reserve Champion Hereford Bull. Bred and exhibited by Messrs. Wilson and McDouall, of Calliope.

PLATE 89.

Ennisview Sir John, Champion Hereford Bull. Bred and exhibited by Mr. E. R. Reynolds, Ennisview, Oakey.

PLATE 90.

Netherby Royal Challenge, Champion Shorthorn Bull for the fourth time in succession. Bred and exhibited by Mr. J. T. Scrymgeour, Netherby, Warwick.

PLATE 91.

Bluff Prince 661st, Champion Devon Bull. Bred and exhibited by Mr. R. A. Howell, Killarney South.

PLATE 92.

Cabulcha Glossary, Champion Aberdeen-Angus Bull. Bred and exhibited by Mr. J. M. Newman, of Caboolture.

PLATE 93.

Ennisview Conqueror, winner of the bull class, six months and under twelve months, also one of the pair of bulls which won the Frank Reynolds' Memorial Trophy. Bred and exhibited by Mr. E. R. Reynolds, of Ennisview, Oakey.

PLATE 94.

Ennisview Cherry Ripe 5th and Ennisview Minerva 10th, First and Second Prize winners in the heifer calf class, respectively, and winners of the pair of heifers class, six months and under twelve. Bred and exhibited by Mr. E. R. Reynolds, of Ennisview, Oakey. Although our illustration makes the near-side heifer appear smaller, in reality it was not so. The judge said, "I have never seen a pair of heifers so evenly matched."

PLATE 95.

Netherby Snow Queen, Champion Shorthorn Cow for the second time. Bred and exhibited by Mr. J. T. Scrymgeour, Netherby, Warwick.

PLATE 96.

Contessa 154th, Champion Devon Cow for the second time. Bred and exhibited by Mr. R. H. Howell, Killarney South.

PLATE 97.

Ennisview Lady Illustrious, Champion Hereford Cow. Bred and exhibited by Mr. E. R. Reynolds, Ennisview, Oakey.

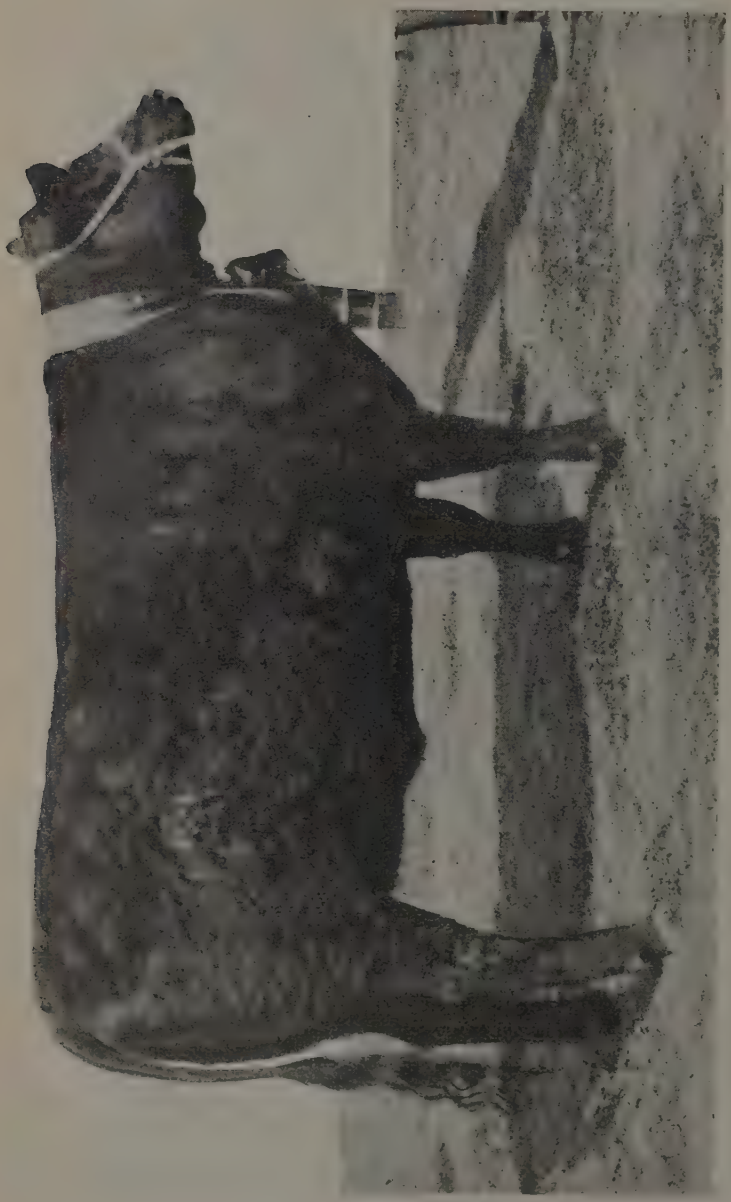

PLATE 98.

Bald Blair Merry, Champion Aberdeen-Angus Cow. Bred and exhibited by Messrs. F. J. White and Sons, Bald Blair, Guyra, New South Wales.

Dairy Cattle at the Brisbane Show.

[Photos. by Department of Agriculture and Stock.]

Plate 99.
Kilburnie Ethel III., Champion Australian Illawarra Shorthorn Cow, the property of Messrs. Macfarlane Bros.

Plate 100.
Cedargrove Ursula, Champion Butter-fat Cow, the property of Mr. W. J. Freeman.

PLATE 101.
Patrol of Cosey Camp, Champion Illawarra Shorthorn Bull, bred by Mr. W. W. James and exhibited by Mr. P. Moore.

PLATE 102.
Oxford Ginger Girl, Champion Jersey Cow, the property of Messrs. E. Burton and Sons.

PLATE 103.
Somehope, Champion Jersey Bull, the property of Messrs. J. Sinnamon and Sons.

PLATE 104.
College Princess Pontiac, Champion Friesian Cow, the property of Messrs. Hickey and Sons.

PLATE 105.
Tenthill Starling's Actuary, Champion Friesian Bull, bred and exhibited by Mr. W. H. Grams.

PLATE 106.
Moongi Prairie Flower, Champion Guernsey Cow, bred by Mr. E. E. Cooke and exhibited by Mr. W. Cooke.

Plate 107.
Linwood Favour, Champion Guernsey Bull, bred by Mr. A. S. Cooke and exhibited by Mr. W. Cooke.

Plate 108.
Fairview Lady Bess, Champion Ayrshire Cow, the property of Mr. R. M. Anderson.

Plate 109.
Claredale Bonny Billy, Champion Ayrshire Bull, the property of Mr. T. Holmes.

A CLINICAL CASE OF ANAPLASMOSIS.

D. FORSYTH STEWART, B.V. Sc.

Although the existence of Anaplasma marginale has been established in Queensland, the extent of the area of infection has been in doubt, and it is thought that it would be of interest to record the occurrence of a mortality due to this organism at Alberton, situated about six miles from Beenleigh, which is on the South Coast line.

The history of the deaths which have taken place on the farm in question is as follows:—

Two years ago four cows were lost on this property. Of these, three died after an illness of several days, but one had survived for five weeks before death took place.

On the occasion of my visit in July of this year two cows, exhibiting similar symptoms to those which had been lost two years previously, had become affected. Of these two, one had survived for six days and had died about a week prior to my visit; the other had been ill for nine days at the time of my examination and was then recovering.

The case was a dry cow of four years of age. The owner stated that the cow was in good condition before it had become affected, but at the time of examination it was in very poor condition and obviously had wasted very rapidly. Although the cow had refused to feed or drink for the first week of its illness these desires had been restored and rumination was observed. Ticks in various stages of development were attached to the beast, and the owner stated that five weeks had elapsed since he had dipped the cattle. Also, he considered that the cattle, when examined, were more seriously tick infested than they had been at any time this year.

Beyond the marked loss of condition the following clinical symptoms were noticed. The coat was harsh and dry. The eye was sunken. The temperature was 103 deg. F. Fæces passed were somewhat dark but otherwise normal. There was no evidence of hæmoglobinuria. Occasionally the animal was heard to grind its teeth.

A smear was taken from the peripheral blood and, on return to the laboratory, fixed and stained with a modified Romanowski stain.

On examination of the smear the presence of Anaplasma marginale and Theileria mutans were noted. The organisms were not numerous, one being seen in every several microscopic field.

NATURAL PASTURE DEFICIENCY DURING WINTER MONTHS.

By J. L. HODGE, Instructor in Sheep and Wool.*

COMPARATIVELY few years ago it was difficult to convince some graziers that their sheep were suffering from malnutrition during the winter months. To the inexperienced eye there is plenty of feed, and the idea of semi-starvation under these conditions is not generally accepted. However, it is no new thing now for the Sheep and Wool Branch of the Department of Agriculture and Stock to receive requests for assistance in the matter of winter feeding. Taking a large proportion of the Darling Downs as an example, it has now become obvious that constant stocking with sheep over a long period of years has to a great extent destroyed the indigenous grasses, and especially the winter grasses, which in the old days were regarded as so valuable. The question naturally arises what to do to supply some supplementary feed during these trying months, having due regard to economy in these times of depressed prices.

Overstocking.

There is no doubt whatever that overstocking is resorted to in some cases. This is a practice which cannot be too strongly condemned. If the grazier would realise that it was to his financial benefit to conserve the pastures, we would have less of it. Two sheep well fed will realise more to the grower than three half-fed animals. We always advise the grazier to ascertain carefully the carrying capacity of his area, and then stock well within that capacity.

Cultivation.

On small areas, where practicable, cultivation on the Darling Downs must come into general practice if sheep, and especially fat lambs, are to be raised profitably. Wheat, barley, and oats all suggest themselves. All are excellent sheep feeds, and apart from that the grower may harvest a cereal crop. Lucerne, than which there is no better sheep feed, should be planted anywhere in the localities suitable to it. Rhodes grass has been proved in scrub areas, and a great deal more use should be made of it.

Wheat and Sheep.

As far as the farmer is concerned, the day has arrived on the Darling Downs when the question is not: "Can the farmer run sheep?" but rather: "Can he afford to be without them?"

Judged from every point of view the results of the combination, sheep and wheat, if properly handled, are profitable under average conditions. In a good season in Queensland sheep are almost a necessity in connection with the crop itself. Fed off at the right time it causes the crop to stool, resulting in a heavier growth. Wheat is an excellent fodder for sheep, healthy and quick fattening, and suitable for any class of sheep. Its chief value, however, apart from profit is in the opportunity it gives to make marketable aged sheep, both ewes and wethers, which will readily fatten on wheat; whereas the task of getting them into a marketable condition on natural grasses would be hopeless. An opportunity presents itself in the matter of fat lambs. No crop excels wheat in this connection. The period, too, at which wheat should be fed off lends itself to this branch of the industry. In connection with this phase of the subject, it is well to sound a note of warning with regard to ewes fat and heavy in lamb. Plethora is to be feared. The farmer under these circumstances would be well advised to keep the ewes off the wheat, except for short periods of feeding, until they have lambed. They can then be depastured on with impunity. Dry sheep may, of course, be run on wheat all the time.

Sheep, being natural scavengers, are of inestimable value in cleaning up the headlands which so often prove the breeding grounds for pests—insect, vegetable, or fungus. It should be the object of the farmer to fatten everything rather than run a flock all the year round. This applies to the wheat farmer purely and simply. Of course, circumstances alter cases, and when the farmer is the possessor of pasture land it should be his first consideration to procure a flock of ewes suitable to his locality, and retain such for breeding purposes in connection with the fat lamb industry.

* In a radio address from 4QG.

It follows in this case that the farmer must so manage his flock as to have his ewes "dropping" coincident with that period when the wheat is ready for feeding off. In the case of a purchased flock, the farmer should make arrangements for his sheep well beforehand so as to be in a position to start feeding off at the time required.

Everything at present points to the fact that wheat is going to be more largely grown in Queensland in the future, and if such is the case, the farmer should not lose the opportunity offering to increase his yearly profits, and, at the same time, save no small amount in the matter of cultivation. The stubble is not to be ignored, and the method adopted by some farmers, that of burning, is condemned. Sheep do excellently on a stubble field, and for this purpose we would advise the purchase of wethers forward store in condition.

So much, then, for the small man, but what is to be done in the case of large grazing areas on the Downs?

The advice with regard to overstocking, of course, applies here, but altogether apart from this the time is fast approaching, or has arrived, when the owner of purely grazing country will have to do something to ensure the better feeding of his sheep during the winter months. It is a matter of economics to decide whether cultivation is the remedy. At present depressed prices for commodities the outlay would possibly be unprofitable, but with a return to normal prices, the opinion is ventured that the operation would be profitable. The sowing of winter grasses at the right period of the year should receive attention. We would advise all growers suffering the disability of mal-nutrition among their sheep in the cold months to experiment with different grasses suitable to the season in a five-acre plot, keeping a careful account of the costs, and observing with the greatest care the results of such trials.

Licks Containing a Protein.

The grazier may, to a great extent, help the position economically by supplying a lick made up for ordinary purposes, but also containing a protein. We would advise the purchase of the following ingredients and their mixing in the proportions stated:—

Nauru phosphate (finely ground)	40 per cent.
Salt (butchers' quality)	40 per cent.
Sulphate of Iron	4 per cent.
Epsom Salts	4 per cent.
Linseed meal, cotton meal, or maize meal	12 per cent.
	100 per cent.

Here you have phosphoric acid P_2O_5, necessary to all animal life contained in the Nauru phosphate, a necessity in salt, a tonic in the sulphate of iron, a laxative, if required, in the Epsom salts, and the protein recommended in the meal.

This lick may be given with safety all the year round if necessary to dry sheep, but it is as well to sound a note of warning with regard to ewes half way through the period of gestation. From these a great proportion of the salt should be taken away at the period mentioned on account of the fact that, with the meal added, the ewes run some risk of taking too much salt, with possible lambing trouble.

This subject of winter feeding is not peculiar to Queensland. Practically every country in the world has to make some provision for this trying season of the year to such an extent, indeed, that in many countries, the stock are, of necessity, housed and hand fed. We may consider ourselves fortunate that we are exempt from these conditions, but it behoves us all to study this most important question from an economical point of view, with the idea of greater individual and State prosperity.

Experimental.

After consultation with an officer of the Agricultural Department we would advise graziers to experiment as follows:—

Lightly cultivate the plot by the disturbance, to a depth of 2 or 3 inches, of the surface soil. Have the experimental plot ready for sowing during the autumn months. Broadcast 5 lb. of Phalaris tuberosa (a strain of Canary grass) mixed with 5 lb. of fine sawdust or clean fine wood ashes. We have reason to think that this winter grass may prove valuable in providing winter feed. A most careful record of the costs should be kept and the results carefully watched. After all, it is only a matter of economics.

THE DAIRY INDUSTRY.

PASTURE MANAGEMENT.

DAIRY BRANCH.

IN previous notes emphasis was placed on the need for the improvement of the production per cow, and sound breeding and weeding or culling were strongly advocated.

The culling of "boarders" is essential, and breeding should be confined to the best of the producers. In addition to breeding and weeding, proper attention to feeding is also essential.

No matter what the output may be it must be efficiently produced, and by practising pasture improvement increased efficiency in dairy farming will be gained.

To restrict production by neglecting essentials—such as pasture improvement, the growing and conserving of fodder crops, and the improvement of dairy stock—is quite unsound, irrespective of any restriction in export that might occur.

Preservation and Improvement of Grass Lands.

Feeding is a most comprehensive subject, and all phases of it cannot be covered in one article. In these notes we shall deal with the feeding of pastures on general lines.

The importance of the work of the preservation and improvement of the grass lands of the State cannot be over emphasised. Native pastures are among the State's greatest natural resources—an asset that has hitherto been neglected through lack of interest and knowledge.

The progress of Queensland and the prosperity of its people are almost entirely dependent on primary production.

The exports of grassland products from British Dominions constitutes 94 per cent. of the total exports of New Zealand, 60 per cent. of the total exports of Australia, 55 per cent. of the Irish Free State's, 41 per cent. of South Africa's, and 17 per cent. of Canada's; while 64 per cent. of the agricultural production of Great Britain is derived from its pastures.

Our pastures, indigenous and introduced, are producing over 70 per cent. of the gross return of the primary industries of this State. The importance of pastures in dairy farming is therefore difficult to over-estimate. The pastures may be looked upon as the raw materials used in the production of wool, meats, and dairy commodities.

The following figures indicate the number of sheep and cattle in Australia, and when it is realised that practically all of them are supported on pasture, the importance of grass in our national economy will be readily realised.

SHEEP (MERINO) IN AUSTRALIA.

New South Wales	53,000,000
Victoria	16,376,217
Queensland	22,324,278
South Australia	6,608,981
West Australia	10,096,614
Tasmania	2,100,000
Northern Territory and Federal Capital Territory	214,000

CATTLE IN AUSTRALIA.

Queensland (nearly 50 per cent.)	6,378,000
New South Wales	3,000,000
Victoria	1,606,000
West Australia	891,000
Northern Territory	844,000
South Australia	214,000
Tasmania	220,000

It is essential, then, in our pasture improvement work to think of and treat pasture as a crop in comparative terms with other farm crops. If it is worth while using the plough to produce an annual fodder crop, surely it is more important that we give adequate attention to our grasses, which represent a permanent pasture.

Grass the Cheapest and Best Stock Food.

Good grass is the cheapest and best single stock food. No form of fodder can compete in cheapness with natural grasses and herbage. Unfortunately, in favourable seasons an enormous quantity of grass goes to waste, for practically all grasses after exposure to heavy dews and scorching sun rapidly deteriorate, losing colour, flavour, and quality; and having but little food value they are only fit for the firestick.

There is little difference between the food values of the various cultivated grasses—paspalum, Rhodes grass, and Sudan grass, and others—yet they vary considerably in composition according to the season, locality, and age of the crop. There are a few grasses like couch grass and prairie grass which stand out on their own, on account of their high food value.

As the dairy cow is required to produce large quantities of milk rich in protein, it naturally follows that it must be fed on fodders also rich in protein. The high percentage of protein in grass while it is in its early stages of growth makes it advisable to feed grasses in as young a stage as possible. As a matter of fact, young shoots of grass, about 4 to 6 inches high, are equal to many valued concentrates in protein content, and this accounts for the rapid recovery of poor cattle when grazed on pastures freshened by a few showers of rain after spells of dry weather, or after a burn.

How Pastures can be Improved.

There are several ways in which pastures can be improved, namely:—

The growing of grasses possessing a high feeding value—In dealing with the growing of grass of a high feeding value, we must not lose sight of nature's adaptation of grasses to different localities. In selecting a species of grass, attention must be given to adaptability to local climatic conditions, period of growth and production, nutritional value, palatability, and suitability for grazing and hay-making. Naturally, a vast amount of experimental work is necessary, which is best carried out on the farms in various districts.

Top dressing of pasture land—Top dressing of pastures lengthens the grazing season and increases returns. Whether it is practicable or not must be worked out in terms of £ s. d., taking into account conditions, price of fertilizer, and market value of the product. Little benefit will accrue from the practice, unless carried out in conjunction with rotational grazing and renovation of pasture.

Rotational grazing, or, in other words, feeding the grass while in its young stage of growth—Controlled rotational grazing, which does not involve so great an outlay, is more a matter of pasture improvement, ensuring the economical use of herbage. The subdivision of holdings to provide for rotational grazing, or the feeding of pasture in its early stages, appears to offer the most ready means of securing an immediate benefit through pasture management.

The chief advantages of rotational grazing are—

(*a*) The animals consume the grass in its early stage of growth when rich in protein.

(*b*) The grass is kept evenly cropped.

(*c*) The animals do not wander over long distances in getting their food, thus extending the grazing time, and preventing the destruction of a quantity of pasture.

Renovation of pastures—The carrying capacity of pasture can very often be doubled by renovation. This is a most important aspect of pasture improvement.

Pastures which are in a very unthrifty, root-bound, matted condition can be loosened up by the use of a renovator effectually breaking up the matted root mass and promoting a fresh growth of succulent grass. This should be practiced in conjunction with rotational grazing. The value of rotational grazing and the renovation of pastures cannot be too strongly emphasised, and any dairy farmer who gives attention to these points in pasture management will secure undoubted benefit from its practice.

In considering grasses, we must remember that they are divided into two broad classes—summer grasses and winter grasses. Most of our pasture grasses are summer-growing, and, consequently, it is necessary to extend the grazing period by the introduction where suitable for winter-growing grasses, such as prairie, cocksfoot, *phalaris tuberosa* or clover (which will necessarily be limited in extent).

When any of these grasses have become more or less established, one of the greatest risks is in allowing them to be smothered out by a rank overgrowth of other pasture, such as paspalum. Much experimental work has been conducted in regard to these winter-growing grasses, but it is desirable for dairy farmers to experiment on their own properties under the conditions peculiar to their district and to their soils.

Our Native Grasses.

Queensland is rich in the number and nutritive properties of our native grasses. The characteristic feature of many is their drought resistance, which is apparent chiefly on our plain and downs country, and our Western lands. Mixed pasturage of grasses and herbage are met with, particularly in the Downs country, providing a highly nutritive pasturage.

Overstocking has been responsible for deterioration of native pastures in most instances, causing the eating-out or destruction of the best of the more nutritive grasses, and the introduction of exotic weeds.

Native grasses in Queensland comprise upwards of 450 varieties, including many of high nutritional value. Combined with herbage, which is found particularly on the Darling Downs, many of our native grasses are all sufficient as a ration.

Conserving Pastures.

The greatest difficulty facing the farmer who depends absolutely on pasture is the great variation in the seasonal production of grass.

There are four ways in which the dairy farmer may overcome this difference in the carrying capacity of his pasture—

1. By top-dressing in autumn in coastal paspalum areas, and early spring top-dressing to bring the pastures away earlier.
2. Growing and conserving special crops, such as maize, sorghum, and other fodders.
3. Establishing special pastures of winter-growing grasses, such as cocksfoot, *phalaris tuberosa*, &c., where possible in suitable districts.
4. Conserving as hay or silage all surplus grass before it has gone to seed and lost its feeding value.

The value of growing and conserving special crops, such as maize and sorghum, is well known, though not practiced to the extent it should be. This refers more particularly to the conservation of such fodder.

Very little has been done in the way of establishing winter-growing grasses—a most important factor in extending the grazing period of pasture, and consequently increasing carrying capacity. Likewise, the conserving of pasture in the form of hay or silage is given scant attention. It would be regarded by farmers as a wasteful practice to allow, say, a crop of several acres of sorghum to rot on the field without making an effort to conserve it; yet many absolutely disregard a fine growth of pasture which, pound for pound, may be relatively more valuable than the sorghum.

Nearly every year our coastal dairy farmers have a surplus of grass in the flush months of January, February, and March. This grass is allowed to go to seed and lose feeding value by becoming rank, overgrown, and stemmy. This grass should always be cut, when practicable, whilst still young and leafy and made into hay.

Supplementary Fodder Crops.

It is not intended to deal with supplementary fodder crops or their conservation in this article, which is intended to draw attention to the value of pasture in our rural economy, and to point to measures which may be adopted by dairy farmers in the interests of efficiency in dairy farm practice.

THE JOURNAL A HELP.

A Camp Mountain farmer writes (17*th September*, 1933):—" . .
I find your Journal a great benefit and help, and may it long continue!"

AGRICULTURAL NOTES.

By H. S. HUNTER, Agricultural Branch.

CROP PROSPECTS.

THE past month has witnessed a period of considerable activity throughout the farming districts in connection with the coming season's cropping. The spring potato planting has been completed, and early sowings have been made of maize and dairy fodder crops. It has been necessary to keep the soil well worked in order to conserve as much moisture as possible from the winter rains. Severe frosts in the inland districts early in the month were responsible for damage to early potato crops, and imposed a check on early plantings of maize. Now that warmer weather has made an appearance the general planting of summer-growing crops may be proceeded with, where sufficient moisture is available for the purpose.

Although, in a general sense, the spring has been ushered in under conditions more favourable than usual, this does not apply in the case of all localities. Rain is badly needed, for example, in the Lockyer and Fassifern districts, where in some instances stockowners are removing stock for agistment to country better supplied with feed and water.

Maize.

As this is the most important maize-growing area of the State, the former anticipations of a record early maize crop may not be realised. However, in the mixed farming districts, the spring planting usually is made with a view to the provision of green feed or silage for dairy stock, particularly since the maintenance of a good milk output has become an economic necessity to many farmers. Silage making is much more in vogue than was the case a few years ago, and where the farm is not equipped with a tub silo the cheaper types of silos are being constructed, particularly the trench, which is increasing in popularity. There are indications that, given favourable weather conditions, there will be extensive plantings of maize this season in the Burnett and Darling Downs areas. The maize crop on the Atherton Tableland, where harvesting now has been completed, is expected to provide a total yield of aproximately 20,000 tons. Although prolonged wet weather was experienced during portion of the growing season, the grain is reported to be of exceptionally good quality.

Cotton.

There is every indication that the coming season will witness a cotton planting equal to last season's record of about 80,000 acres. Already seed has been distributed for nearly 50,000 acres. In the main cotton belt of the Upper Burnett and Callide, seasonal conditions are more propitious for a successful planting at the ideal time of the year than at any time in the history of cotton growing in that area. Many acres of new scrub country have been cleared, and in some instances old-established growers are extending their areas.

In Southern Queensland a plot of cotton as a sideline crop is coming back into favour. Although only moderate yields were obtained last year, owing to adverse seasonal conditions, the cotton crops stood up to the dry conditions better than maize, and provided sufficiently attractive returns to warrant an increase both in the acreage and the number of growers, which can be expected if suitable rains fall during the current month. There is now a greater feeling of confidence in the future of the cotton industry, as the recent attitude of the Federal Government towards it gives an indication that it may enjoy a greater measure of stability from a political point of view.

Tobacco.

Land preparation is well advanced for the forthcoming tobacco growing season. The total area under tobacco last season is estimated at 7,400 acres approximately, and the yield of cured leaf at about 2,250,000 lb. The fact that the general average quality of the leaf was adversely affected by the faulty distribution of the rainfall naturally has caused disappointment to the growers, but the majority of them are facing the approaching season with every confidence, and express the opinion that as a result of their experiences they are better equipped with essential technical knowledge.

It is more widely recognised also that success cannot be expected to attend the efforts of growers generally unless all concerned take effective action to deal with the pest and disease menace by observing in the respective districts a more uniform growing season and by uprooting and destroying all old plants immediately after harvesting.

Winter Cereals.

The crops of wheat, barley, and canary seed are in a very satisfactory condition, and should rain of a general nature have fallen over the wheat belt by the time these notes appear in print the prospects for a bumper yield will be particularly promising. It is estimated that the area planted with wheat is considerably in excess of last season's area of 311,000 acres, and should favourable seasonal conditions continue a yield of about 4,500,000 bushels is anticipated. Not only are the conditions generally satisfactory in the main wheat belt, but the Maranoa to date has experienced an unusually favourable season, although the crop was planted about a month late. In the Dawson Valley there has been ample rainfall for wheat this season, a factor that has been responsible for crop failures there during the past three years.

A proportion of the area under malting barley has been planted this year with seed of the Winter, Spratt, and Plumage Archer varieties imported from New Zealand with the object of improving the malting qualities of the locally-grown grain. Seed propagation areas of these varieties have been planted also with seed imported from England for the purpose by the Department of Agriculture.

Dairying.

With the arrival of the warmer weather and an improvement in the pasture, the output of dairy products is on the increase, and the mixed farmer has been encouraged further by a welcome improvement in the market values of butter and pigs.

The local markets for farm fodders, potatoes, &c., have continued reasonably buoyant, considering the ruling values of commodities generally.

There is a growing recognition throughout Australia of the necessity to improve dairy herds by the use of selection bred-for-production bulls and the culling of unprofitable cows. The reported destruction of large numbers of dairy cows in Denmark can be calculated to raise considerably the average production per cow in that country.

A Correction.

In "Agricultural Notes," September issue, page 230, under the sidehead "Clydesdales in Demand," second line, an obvious error in figures occurred when it was made to appear that there are "12,223 tractors" in operation on Queensland wheat farms. The misprint was due to an error in the typed copy, which was overlooked in the proof reading. The number of tractors in use on Queensland wheat farms is 1,223. The paragraph as corrected should read—

A recent survey of the forms of tractive power employed on wheat farms in Queensland reveals that 1,223 tractors and 16,764 horses are employed in this industry. Both tractor and hores are used by 753 wheatgrowers, and 1,300 farmers rely on horses only.

SUMMER-TRAINING YOUNG DECIDUOUS TREES.

It is necessary during the spring and early part of the summer to look through young deciduous trees periodically, and to direct their growth by pinching back the growing points of leaders which are outstripping their neighbours. This keeps the growth even.

When the leading shoots of young trees are extending very fast it is sometimes necessary to pinch them back to prevent them being broken out, or blown out of shape by heavy winds. Care should be taken when doing this that the shoots are not cut or pinched back below the tender growth, as if the more mature woody growth below is cut into there is a liability to permanently stunt some kinds and varieties of fruit trees. Even with vigorous older trees it may be advantageous to thin the growth to some extent to allow more light to penetrate through the tree.

This work must be carried out carefully, and it is far better to underdo it than to overdo it. If shoots are thinned out to too few the remainder are far more liable to be destroyed by winds. Superfluous shoots towards the centre of upright growing trees encourage the desired shoots to grow with more outward spread. Moreover, it should never be forgotten that the leaves are the lungs and digestive organs of a plant, and any reduction of foliage checks the growth of the plant.

Trees that have been reworked by budding or grafting require the same care as the young trees, but though strong shoots from the stock must be checked or entirely removed if they are sapping the growth from the buds or grafts, it is a distinct advantage to leave as much foliage as possible.

MAIZE GROWING ON THE ATHERTON TABLELAND.

By O. L. HASSELL, Instructor in Agriculture.

THE Atherton Tableland maize belt is situated 68 miles by rail from the port of Cairns, between the 17th and 18th degrees of latitude south, and between 2,500 ft. and 3,000 ft. above sea level, and the town of Atherton is its commercial centre.

Atherton is named after Mr. John Atherton, one of the earliest pioneers of the district who selected land in that part of the country some time before there was any railway communication.

Climate and Rainfall.

Being situated in the tropics the growing season is one of heavy rainfall, characterised by more or less heavy thunder storms, with diminishing intervals between, and bright hot days, during which the necessary cultivation of the young crop is effected. In the ripening period of the grain the days are dull and cloudy, with a persistent drizzling rain or mist. The atmosphere becomes so humid that evaporation of moisture from the ripened cobs, to permit of them being harvested, is slow, delaying operations until about the end of July, when rain generally ceases.

Soil.

The soils of the areas devoted to maize growing on the Tableland are wholly a rich volcanic loam, red shading to chocolate in colour and of great depth. They are locally termed scrub and forest, respectively, from the growth peculiar to them in their virgin state. From the total analysis these soils are extremely rich, comparing very favourably with any other large soil areas in the world. This fertility is also evidenced in the crops of maize obtained. In a good season and under proper cultivation the soil is yielding satisfactory returns after forty years continuous cropping and without the addition of commercial fertilizers.

Beginnings of Maize growing at Atherton.

The original dense jungle was famous for its heavy growth of valuable timbers. Maize was first grown on the Tablelands as far back as 1870. The discovery of tin at Herberton in 1880 and the rush from Thornborough to the stream tin diggings on that field opened a small market for the few poineer maize growers. The maize was carted over the range and sold on the mining field at about £3 a ton. Later came the influx of the Chinese, on whom there was practically no restriction. The Chinaman is no axeman or bush worker, so the land was selected by White Australians, who felled and burnt the jungle, while the Chinaman came in as lessee at the rate of no rent for the first year, 10s. for the second year, and £1 per acre for the third and following years.

The Chinaman's only method of tilling the soil for many years was with the hoe. The maize crop was grown amongst the stumps and logs left after the fire, and no further clearing was done. The extraordinary fertility of the soil and the regular rainfall were conducive to very heavy crops.

Harvesting was done by the Chinamen. They pulled the maize, bagged it, and carried it out on their backs to central tracks, where it was loaded on to sledges and taken to roughly constructed barns. The maize was shelled with the ordinary hand sheller, and if an immediate sale were not made it was stored for various periods in the barns, where much damage was done by weevils and mice.

Queensland, however, was little the richer for the Chinaman's efforts, for most of his earnings eventually went to China. Many of the shrewder of his compatriots, acting as dealers in maize in later years, made large sums of money by buying when the product was cheap and selling when scarce and high prices were ruling. This did not take place until the growth of Cairns and extension of railways provided a good local market. Alien restriction legislation subsequently limited the number engaged in the trade.

The resumption of a portion of the Atherton lands to form the Tolga Soldiers' Settlement was made in 1921, and this was really the first widespread movement towards keeping maize growing on the Tableland a white man's industry.

The passing of the Chinaman meant that Atherton had at last come into its own, and was on its way to become one of Australia's foremost maize growing regions.

In later years the remaining Chinamen learnt from the Australian farmer the better method of storing maize in hermetically sealed tanks, but this method did not prove highly satisfactory in many cases, due to the lack of any appliance for determining the moisture content of the grain before storage, although the expert farmer was able to judge fairly correctly whether his maize was fit to store or not.

In these days maize was shipped to different parts of Australia and, at times, was found on arrival to be unfit for use, as it had been loaded with too high a moisture content, and had heated in transit.

The marketing of all the Atherton Tableland maize before the advent of the pooling system was in the hands of the local storekeepers and the large merchants from other centres with their representative buyers.

No attempt was made to artificially dry the maize, which is essential, owing to the moist climate during the ripening period and the length of time it takes to dry naturally in the field, and the loss due to mould.

In 1923 the establishment of the Maize Pool was followed by the construction of three sets of silos capable of holding, approximately, 3,000 tons each, and fitted with a modern cleaning plant and elevators. The silo at Atherton is fitted with a specially constructed drying plant. The others at Tolga and Kairi have only the cleaning plant and elevators. All these improvements meant—

(*a*) A better system of storage;

(*b*) More efficient handling of the large crop;

(*c*) Modern methods for cleaning, drying, and testing as to moisture content, &c.; and

(*d*) Prevention from damage by weevils and mice once the product is stored in the silos.

The storage capacity of the silo at Atherton is being increased; when completed its storage capacity will be 13,500 tons.

The present pooling system is controlled by a board consisting of five farmers elected by the growers. Since the establishment of the maize pool a large quantity of maize has been shipped overseas (as much as 5,000 tons in one shipment), and reports show satisfactory delivery of good quality grain.

Value of the Maize Industry at Atherton.

Regarding the value of the maize industry to North Queensland, the following information has been supplied by the Atherton Tableland Maize Pool Board:—

> Approximately 18,000 acres are utilised annually for maize growing, producing an average crop of 17,000 tons of maize. From 350 to 400 families are engaged annually in the industry, and approximately 170,500 tons of maize have been handled by the pool during the past ten years, representing an amount paid to the growers of about £1,075,000 after the deduction of all administrative and working expenses.

An increase in the foregoing figures may be looked for when machinery is added to the silos to treat the raw material for the manufacture of many maize by-products.

The district pig industry, a thriving one with its Co-operative Bacon Factory at Floreat, is partly dependent on the maize industry. The establishment on a sound basis of so important an industry stands greatly to the credit of those concerned in its foundation, in that it has been the means of settling many men and their families on the land and of adding to the commercial importance of the far North.

Seed Maize Selection and Raising of a Standard Variety.

The selection of a seed maize with a view to obtaining a variety most suited to any particular locality is of vast importance to every Tableland maize grower. The variety that will produce the heaviest yield, best quality and resist disease and mould in wet seasons are all points to be observed in the selection of seed maize as well as the characteristics of plant growth. The farmer who carries out his own method of seed selection knows that by planting an inferior seed he must expect to reap the like. To produce a grain of high quality throughout the district all farmers should plant only the best seed procurable, and to deliver the resultant crop in good order to the silos. It must be remembered that if a maize of poor quality is delivered at the silos, it can not be turned out a merchantable commodity.

Seed Selection.

The selection of seed should commence in the field. The farmer should first make himself familiar with the variety which he considers is most suited to his locality. The following points should be observed in field selection:—

Select from good healthy strong stalks free from disease.

Select only those cobs that are low down on the stalk and which, when ripened naturally, have turned down.

A cob with a good thick husk covering and well covered over the tip.

A cob attached to a strong shank.

Having observed the foregoing, the person selecting the seed should tear a strip of husk from the cob while on the stalk, and note as to whether the cob is well filled with good straight rows and the grain true to the required type. If the cob thus opened is not suitable, it should be left on the stalk to be picked during the main harvest. After completing the selection of seed in the field the cobs so secured should be taken to the barn and carefully sorted out. It is advisable to keep only those true to type with good, sound, even grains. When the final selection is complete the cobs should be topped and tailed, the term usually applied to the method of removing the round and irregular grains from both ends. The idea of this is to secure a good even-sized grain, thus obtaining an even plant.

Storing Seed Maize.

The weevil will ruin seed maize grain unless properly protected. The best method of storing seed maize is in hermetically sealed tins, especially constructed for the purpose, or by mixing naphthalene with the seed at the rate of 1 lb. to a 400-gallon tank. With the latter method the lid of the tank in which the seed maize is stored may occasionally be lifted and the seed inspected.

SEED MAIZE FOR SALE.

Maizegrowers are informed that the Department now has available for distribution an additional stock of selected stud seed maize of the Improved Yellow Dent variety, price 9s. per bushel, railage paid to the purchaser's nearest railway station. Supplies of all other varieties are exhausted.

Improved Yellow Dent.—A tall-growing, late-maturing variety, five to five and a-half months. The ears are cylindrical in shape, carrying sixteen to eighteen tightly packed rows. The grain is deep, wedge-shaped, of rich amber colour, with a yellow tip cap and rough, coarse dent. It is suitable for coastal districts and scrub lands where there is a good rainfall. It is capable of giving heavy yields of grain and fodder. Special strains of this seed have yielded over one hundred bushels per acre under field conditions.

As supplies are limited, the quantity available for any one applicant is restricted to not more than three bushels. All orders must be accompanied with remittance. Cheques with exchange added should be made payable to the Under Secretary, Department of Agriculture and Stock, Brisbane.

BLUE PANIC GRASS (*Panicum antidotale*).

NUMEROUS inquiries have reached this Department from all over the State regarding this grass, which has been under observation by different officers in the northern and southern portions of Queensland, and the following extracts show its behaviour under varying conditions. In addition, this grass has been tried out at the Queensland acclimatisation gardens at Lawnton.

Some weeks ago an article appeared in one of the Brisbane papers in which an analysis of this grass carried out in the Departmental laboratory was given. By the omission to state that the sample submitted was a moisture-free sample—*i.e.*, dried—it conveyed the impression that its nutritive value was far above that of lucerne, which is incorrect.

An analysis of water-free lucerne shows that lucerne maintains its pride of place as a fodder of high nutritive value. Analyses of samples, unless definitely stated to be "water-free," are totally misleading as to the value of fodder in its green form.

Commenting on the performance of Blue Panic grass under conditions obtaining in the Maranoa, Mr. R. E. Soutter, manager of the State farm, Bungeworgorai, says:—

> "This is a tall, rapid-growing grass, and if its feeding value is even only fair, should prove a wonderful variety in assisting to reclaim the pear country. The small plot here, sown on 17th November, came up rather thickly, and has not had any moisture since it was in the feeding stage other than rain. At time of writing (30th June) it is one compact mass, 5 feet in height, with stalks ½ inch thick and solid, and has produced enough seed to sow a plot 100 times the size taken up by it. The seed, which is produced liberally throughout its growth (the first being collected in March), is of such a nature as to permit of its being sown with the ordinary seed drills."

PLATE 110.—BLUE PANIC GRASS.
Note its coarse growth when not mown or closely grazed.

Mr. N. A. R. Pollock, Senior Instructor in Agriculture, writing from Townsville, states:—

"I would advise that our experience is insufficient to warrant a pronouncement as to its value for pasturage or fodder conservation."

A few rootlets of this and other grasses were obtained, through the courtesy of Professor Prescott, from the Waite Agricultural Research Institute, Glen Osmond, South Australia, some three years ago, and a plot established, but, owing to the necessity then arising for almost undivided attention to be given to instruction in tobacco-leaf production, it was not practicable to proceed further. As a consequence, no data are available on its fodder value, palatability, or behaviour when grazed by stock, particulars of which are regarded as essential to a recommendation or otherwise.

The grass makes a very rapid growth under favourable conditions after being cut down or grown from seed, which is freely produced, but, unless close-grazed or mown down, becomes extremely coarse, as will be noted in that depicted on the accompanying photograph.

At Ingham Mr. Shearer, who obtained a little seed from our plot, speaks very highly of the grass, but on a visit to his farm it was found the favourable impression was due to the rapidity of growth, none having been fed to stock.

In the coming season it is intended to arrange plots of this and other grasses in different districts, from which reliable data may be expected.

A report furnished by Mr. F. F. Coleman, on behalf of the Queensland Pasture Improvement Committee, regarding the performance of this grass at Lawnton states:—

"This plant can best be described as being of erect habit and blue-green in colour. In its young stages it produces a quantity of succulent leaves. After seed-heads appear it becomes very stemmy and harsh, eventually developing a thin bamboo appearance at a height of 5 feet or over—a summer grower that will also give feed in the cooler months on the coast.

"In our trials it was found that when the spring came a quantity of young leaves appeared from the nodes of the harsh stems, which would provide picking for cattle.

"The storage of plant food in bulbous eyes at the base of each stem enables regrowth after grazing, even under dry conditions.

"If kept well eaten down, the harsh stems naturally cannot appear, and in their place would be found a continuity of short young grass, at which stage the best feeding value is found.

"The following table is set out for comparative purposes:—

Kind of Plant.	Analysis of Waterfree Material, showing the Highest and Lowest Crude Protein.	Remarks.
Panicum antidotale ..	Highest, 20·6 per cent. ..	Stemmy leafy growth up to 2 ft. 6 in. in height
	Lowest, 11·5 per cent. ..	Old growth, stemmy, leafy, harsh.
Rhodes Grass	Highest, 16·4 per cent. ..	Young leafy growth
	Lowest, 5·8 per cent. ..	Old stemmy growth
Lucerne	Highest, 29·4 per cent. ..	Young leafy growth
	Lowest, 18·4 per cent. ..	Preflowering stage, old matured growth, with seed pods showing

"From the foregoing analyses it will be observed that lucerne is higher in protein content than both Rhodes grass and *Panicum antidotale*.

"The latter has done well in Rhodes grass areas, but it remains to be proved which is the superior—Rhodes or this grass. This plant, it will be observed, is a panicum, and does not contain the dangerous poison hydrocyanic acid that is found in Johnson grass, *Sorghum vulgare*, and Sudan grass."

THE PUBLIC SERVICE.

Of all the official reports presented to Parliament annually, none is more interesting, pithy, and attractive in literary style than that of the Public Service Commissioner, Mr. J. D. Story, I.S.O., and from which the following pointed paragraphs are taken.

TEAM MEN AND TEAM WORK.

"FORWARD planning" has become the vogue. Some time ago it was "Produce: produce." Later it was "Reduce: reduce." But slogans, like other things, go awry. We are told to produce for export; we did. Now London calls—reduce your exports; saturation point has been reached. Then the wizards of finance cried, "Reduce expenditure." Dire necessity compelled reduction, and dire necessity is not a respecter of persons or Services. Unfortunately, but unavoidably, reductions boomeranged in places and, in the States, balanced budgets have not yet been reached. Now—"Forward planning." Personally, I rather like the idea. There is room for forward planning in State administration. But, to be really effective, it should be done on a comprehensive scale and not in piecemeal fashion. Forward planning in a State scheme should connote departmental co-operation and co-ordination —team men and team work. All should be for the State; none should be merely for a department; and, particularly, none should be only for self—which is selfishness. The experience of the Employment Council, for example, has shown that, when key men of departments get together in the right spirit and with the will to pull their weight in the country's interests, fine results can be achieved. It has been demonstrated that there are directions in which there can be much good team work in developmental forward planning in roads, lands, forestry, agriculture, mining, public works, &c. But the personal equation counts for much: vision should be wide; ideas should flow freely; original thinking should be welcomed and encouraged; criticism should be constructive and not merely negative, and criticism should not be misconstrued. Unfortunately, however, there is a danger that proposals emanating from a body of this kind will not always be received kindly. At times suggestions which are made with the best of goodwill are received in some quarters with suspicion and looked upon as a form of interference. Amongst the bugbears of administration are the passive resister and passive resistance. On the other hand, amongst the joys of administration are those broad-minded, able, cheery men who pull together, who put the State before self, and who are so sure of themselves that they do not worry about professional dignity.

The Phantom Host.

There is a widespread obsession that there exists in the Queensland Service a host of higher officials who have been born in the purple, who draw pay, allowances, and perquisites reminiscent of feudal days, and who are a heavier drain upon the Treasury than the exchange and interest payments. But this phantom host is merely the figment of an obsession. Exclusive of the Judges, members of the Industrial Court, and railway officers, there are seventeen officials in Queensland who are allocated nominal salaries in excess of £1,000 per annum. As a result of the operation of the Salaries Act, only seven actually receive salaries over £1,000 per annum. The Director of Education, for instance, draws £902 per annum, and the Under Secretary for Mines £738. One feels a little ashamed to disclose these facts. Indeed, officers in receipt of salaries in excess of £500 per annum in all Crown services (exclusive of Railways), whether paid from the Consolidated Revenue Fund, from Trust Funds, or from Loan Funds, only absorb approximately £155,000, or 4.6 per cent. of the total salary bill of such services. Even if this group were eliminated altogether, the amount which would be saved would not go so far as some people seem to think towards paying the exchange and interest bills or in balancing the budget. And, far from being born in the purple, most of these men have won their positions by preparation, industry, ability, and grit. It seems somewhat trite to say that, if ever a time existed when really good men were needed, that time is to-day. It is true nevertheless. Capable leaders are essential; but the first-grade Economist will not be obtained for the price of a poddy, nor an efficient Roads Commissioner for the pay of a sandwich-man. With really good

leaders at the top, good results are usually obtained throughout the whole range of the organisation; departmental inertia is banished, and amongst those who benefit most are the rank and file. Bad leaders give bad results, and the evil which they do is sometimes well-nigh irreparable. State and civic records afford proof. Crown departments and sub-departments are of sufficient importance to warrant the employment of good men. Moreover, Ministers are entitled to sound advisers.

Testing Time.

Sweet are the uses of adversity, wrote England's chief bard. But the Queensland Public Service now finds financial adversity rather bitter. In the first year, the Service bore with blended loyalty and stoicism salary-reductions and the withholding of salary increases; these were the Service's personal contributions to budget-balancing and the general demands for reduced expenditure. But, on account of the withholding of automatic increases, even from juniors, in the second year and the third year, a spirit of pessimism began to pervade the ranks. In some ways, the Queensland Service has been hit hardest of all the Services of the States and Commonwealth. The juniors, and the married men with young families, have had a particularly lean time. The only consolation has been that they at least have had jobs—bread without butter or jam.

The position of the male junior clerk who, during last financial year, completed three years' service is shown hereunder:—

Financial Year.	Salary Payable if Automatic Increases had been continued.		Salary Paid as a Result of Non-Payment of Automatic Increases.	
	Nominal Salary under Award Operating prior to Salary Reductions.	With Salaries Act Reduction.	Nominal Salary.	With Salaries Act Reduction.
	£	£ s. d.	£	£ s. d.
1930-31	110	99 0 0	110	99 0 0
1931-32	130	110 10 0	110	93 10 0
1932-33	150	127 10 0	110	93 10 0

But, despite sporadic fulminations—fulminations which contain much of the effervescence of youth—the Service as a whole is passing through the severe testing time of adversity with much credit. It has carried on and it will still try to carry on, but the burden should not be made too heavy; stoicism may give way to an all-round pessimism which will beget sullen resentment, with resultant loss of morale and efficiency.

The One-track Mind.

Every dog has his day, so they say. Even sectional specialists seem to have their day in acute crises, and then—their yesterday. To-day the economists and the engineers are hailed as the world-savers; other experts have done their dash and left the world still sick. A specific disease may call for the specialist; but specialisation connotes restriction, and restriction leads to the one-track mind. But the world to-day is suffering from a series of ills—not one ill only. Economists and engineers are regarded as men of many parts—otherwise of many tracks; hence they are welcomed as men who may put the world back to work. Besides, forward-planning is part of the scheme; and they are the forward-planning experts. May they succeed, and succeed quickly. But when the stage of retrospect has been reached, it will possibly be found that the chief factor in recovery was just sound, simple common sense.

I fear that, apart from sealing-wax and red tape for which he is supposed to have a penchant, the public servant is generally looked upon as a man with a one-track mind. In some respects the assumption is not ill-founded. Certain departments exist for Crown purposes only; they have no counterpart elsewhere; they are isolated units even in a governmental organisation. The employees become highly efficient, in sooth—experts in their special work; to the extent that the work is highly specialised, their official world becomes circumscribed and their departmental outlook tends to contract rather than to expand. Sometimes, too, the characteristics of the work seem to influence the nature of the man. Yet, necessarily,

it may take a long time to master the niceties inherent to the office and to acquire the knowledge and gain the wisdom essential to efficiency. In such cases, the development of a one-track official mind can be understood; and there are compensating advantages. In other cases the disadvantages are acute; there are departments in which activities interlock with the activities of other departments. So far as such activities obtain, these departments should work and move in unison and not as detached fragments. Some do, others do not. The man with the true administrative flair is in touch with many tracks—not one only; his official horizon is Service-wide, not merely departmental. A one-track man in a responsible position in a department of Service-wide ramifications can do much harm to the administration as a whole.

Service-Regard or Self-Regard.

There are a few who seem to think that regulations (and even some of the ten commandments) are archaic, and that a form of control should be inaugurated, and a revised decalogue issued, which will conform to what may be termed the ultra-modern vogue. But the few notwithstanding, regulations, like the old commandments, are necessary, and should be honoured in the observance. In Public Service administration, regulations are framed to meet the requirements of the Service—and that is as it should be; the individual should conform to the regulation, the regulation should not be adapted to suit the individual. The code contains an injunction that every officer shall, during the hours of duty, devote himself exclusively to the discharge of his public duties, and shall behave at all times with courtesy to the public, giving prompt attention to all reasonable requirements. There is nothing archaic about that regulation. A public officer should not place himself in a position in which his private and personal interests will conflict with his official duties. Service-regard should transcend self-regard. The code also prohibits officers from seeking the influence or interest of any person in order to obtain promotion, transfer, or other advantage. That prohibition has much to commend it, particularly as another section of the code prescribes that promotion is to be determined by efficiency and seniority.

The Braying Vicar.

There is more of the sombre than the gay in the official life of some of the Service heads. But incidents at times provide them with welcome interludes of amusement, even though it be tinged with a little cynicism. Events may involve a change of Ministerial chiefs; then a certain order of vicars who always seem to toss with a double-headed coin reappear. The new Minister is told tales of wrongs which have been inflicted by official tyrants; it may be unfair reduction in status, unwarranted withholding of promotion, deprivation of privileges, and so on. Then comes the very natural call for reports. But, as officials are not retainers of either the Montagues or the Capulets, but are servants of the Crown, and are (or should be) unbiased in their administration and just in their decisions, the process of unmasking the vicars is not usually a difficult one. Be it said, too, that the reports generally reveal that the vicars themselves have been more sinning than sinned against.

But many of them are optimists; they will bide their time; they will come again.

Administrative Pioneering.

Some aspects of Public Service administration are like pioneering—a hard slog and a long slog. The blazing of the track which leads to reform is often far from easy; winkleism and prejudice, with a colouring of jealousy, are as hard to overcome in their way as the jungle. But, then, the Public Service is not alone in this respect: think of the Australian wool and meat industries. On annual speech days it is apposite to talk of the traditions of the old school, to remind the boys of to-day that they will be the men of to-morrow, and to exhort them to keep the school flag flying. But when reform is mooted in the counting-house, one sometimes longs for a little less of tradition and a little more of progressive thought. The departmental caveman was loth to change tomes for cards, nibs for typewriters, ledgers for loose leaves, penwork for accounting machines. But the changes came; slowly in some directions, but ultimately they came. The attempts at the reorganisation of the agricultural industry are still in one's mind. A decade ago a detailed inspection of the Agricultural Department revealed very plainly that the marketing end of agriculture, even more than the growing end, needed to be organised on sound lines, and recommendations for reorganisation were made. Many forecasted, however, that merely a crop of tares would result. But what of to-day! Even the unassuming peanut has become famous. Because

of the decision in the Peanut case, there was a fear that commodity boards, fruits of agricultural reform, might perish; hence a rush to save them. Thus, after all, agricultural reorganisation has proved to be worth while. And so it was with rural schools; when the first rural school was outlined and planned, bumbledom and much of officialdom jeered; patience and doggedness were needed to win through. Now there are many in the land who would rather abolish some of the secondary schools than lose the rural schools. Indeed, the educational cry of the hour is for more rural schools. Nevertheless (and disrespect of the Ancient is not intended), there is room both for Horace of the classics and for Horace of the studbook, but each of his own sphere. Keep Horace of the classics to the classics and the things which pertain to the classics; but let the farm have its own Horace. Just as it is not thought wise, nationally, to mix colours, neither is it wise to mix Horaces. Yet it takes a lot to convince some people. A Public Service Commissioner is neither omniscient nor omnipotent; but time tells.

The Right of the Female to Work.

The subjects of female employment and equal pay have been discussed freely during past months. With me, equal pay is a story for another day—perhaps in the Industrial Court. But, as the Crown is the largest employer of females in the State, the expression of a few thoughts on that subject may be timely. Apart from the scientific, higher technical, and manual sections, which are staffed almost exclusively with males, Public Service administration (exclusive of teaching) may be divided broadly into four sections—higher administrative, lower administrative, major detail, minor detail. The first three sections embrace what are known as the classified positions and the last section comprises the routine positions. The number of females holding classified positions (exclusive of teaching sections) is negligible. The minor detail section includes routine clerical work, typing, filling in of card records, card indexing, sorting, and the like. Females are very suitable for much of this class of work, and its salary-value is not high. Care is taken as far as possible that, even in the minor detail section, males are allotted the work which leads to the higher positions, and the fact that classified positions are held almost wholly by males is proof of that statement. Typewriters, dictaphones, table telephones, and accounting machines of various kinds have displaced much penwork, and, generally, females are very proficient operators. The greater the development in machine work the greater will be the tendency to employ females on such work. So is it in the Teaching Service—the section which absorbs most of the female employees. As both boys and girls have to be taught, females must be employed as well as males. And many educationists contend that, in the lower classes at least, females are even better suited for the work than males. I should not care to take the responsibility of submitting a recommendation to the Government that the stenotypists and the female teachers be dispensed with and their places be filled by males. Many of these females, too, not only have to support themselves but have to contribute to the family income. But does not the question of the restriction of female employment raise the even wider question of the whole Education system? If the employment of females is to be restricted, should not the Education system be recast, seeing that at present it is based on the principle of co-education? Scholarships, for example, are stepping-stones to employment; if, then, the employment of females is to be restricted, should the system of State scholarships—two-year, Extension, and University—be continued on the existing equal basis? Does not restriction in the one direction connote restriction in the other direction; then, too, would not the further question arise as to whether the present expenditure on the education of females, particularly higher education, is warranted? Female education, female employment, equal pay—another form of the eternal triangle.

A JOURNALIST'S APPRECIATION.

The managing editor of an important Southern publication writes (18/9/33):—"*. . . I find your Journal most interesting and instructive.*"

OUR EXPORT TRADE WITH BRITAIN.

ACTING AGENT-GENERAL'S REPORT.

In his annual report to the Premier and Chief Secretary (Hon. W. Forgan Smith), the Acting Agent-General for Queensland in London (Mr. L. H. Pike) has included a valuable review of our export trade in primary products with Great Britain, and from which the subjoined extract has been made.—Ed.

TRADE AND COMMERCE.

REVIEWING the history of the economic development during 1932, the outstanding feature of the year has been the altogether unprecedented low rates of interest for money. This was the direct result of reduced industrial activity, and of the difficulty in finding profitable and safe employment for capital, thus enabling gigantic conversion operations to be carried out by the Government.

The most remarkable event of the year has been the adoption in this country (Great Britain) of the policy of protective tariffs. It is obvious that the Government had no choice but to follow the example of all other nations, and for the time being this change can be looked upon as inevitable, both for the purpose of protection and to assist in making up the deficiency in the yield derived from direct taxation—a field which has been exploited to its utmost possibility.

It is hardly necessary to dwell on the impediments placed in the way of international trade by exchange restrictions and other regulations imposed by an increasing number of countries to check the export of capital. Until these irksome restrictions can be withdrawn, and the other international barriers and prohibitions have been lowered or removed, it would be useless to look for a return to sound trading conditions.

The Board of Trade returns of the imports and exports of the United Kingdom show a big contraction in turnover, as in the case of all other nations. This, however, must be mainly attributed to a reduction in values rather than in the volume of trade. The visible adverse balance has been reduced from £406,000,000 in 1931 to £286,000,000 in 1932, the lowest since 1913, which is the direct outcome of the fall in sterling and import tariffs. These figures would appear to indicate a considerable improvement in the financial position, but it must not be overlooked that the invisible favourable trade balance must have suffered seriously from the reduction in dividends received from foreign investments, and as the result of the falling off in freight earnings of the shipping companies.

SUGAR.

The Chancellor of the Exchequer in his Budget Statement of 1932 announced an increased preference of 1s. per cwt. on all Colonial sugars entering the United Kingdom market during the next five years. He also explained that a special supplementary preference of 1s. per cwt. for five years on a limited quantity of Colonial sugar would be granted on the allotment of certificates by the Colonial Office among the sugar-producing colonies in proportion to their total exports. The two preferences are liable to adjustment and gradual disappearance in the event of the price of sugar rising above a certain figure.

The duties on Dominion and foreign sugars were not altered in any way.

As this decision of His Majesty's Government involved a new principle of differentiation between Dominion and Colonial sugar suppliers, under instructions from your Government, representations were made by me to the Secretary of State for the Dominions with a view to clarifying the position. I subsequently submitted full and complete reports to you on this important question, and all I need say here is that His Majesty's Government indicated in reply that the special concessions mentioned above were given on account of the exceptional circumstances of the sugar

industry in certain colonies, for the support of which the Government in the United Kingdom was ultimately responsible. It was stated—

> "That the complete ruin of this industry would involve a direct charge on the United Kingdom taxpayer, who would be obliged to provide from voted monies grants for the relief of unemployment and the maintenance of administration. It was decided in these circumstances that the financial consideration involved made it quite impossible for the concession to be extended to the Dominions."

I was present at a deputation from the Sugar Federation of the British Empire which waited upon the Chancellor of the Exchequer in March, and urged upon His Majesty's Government the advisability of increasing the duty on foreign sugar entering the United Kingdom market. The Budget which followed in April did not adopt this proposal.

At the suggestion of the Queensland Sugar Board, and with the approval of the Commonwealth Government, your Government instructed me to attend the Imperial Economic Conference at Ottawa. I made arrangements accordingly, and on my return to London submitted to you a full and lengthy report on the results of my mission. The outcome of the Conference may be summarised here by recording that the existing preferential margin on sugar granted in the United Kingdom market is now stabilised until August, 1937.

The London brokers, acting as agents for the Queensland Sugar Board, again negotiated a contract for the exportable surplus, and altogether a total quantity of approximately 188,000 tons of sugar was shipped during the period from June, 1932, to January, 1933. Of this quantity some 50,000 tons went to Canadian refiners. It is understood that this year the Canadian refiners have made no complaints, and it may be assumed therefore that Queensland raw sugar manufacturers have now succeeded in making an article suitable to the requirements of these buyers.

During the past few months negotiations have been proceeding between United Kingdom refiners and beet interests in order to arrive at some basis of rationalisation of the whole sugar industry, with the object of doing away with the price-cutting competition which for the past few years has been in operation, particularly during the months of the beet campaign, which happen to coincide with the arrival in this country of Queensland sugars. As these negotiations have been undertaken, it is understood, with the sanction and approval of the Imperial Government in relationship to the expiring beet subsidy, it is confidently anticipated that should any definite scheme be evolved within the industry, this would form the basis of future Government action, in which case no doubt some indirect advantage would accrue to the Queensland industry.

As a result of the revised British preferential scale of duties, larger quantities of Queensland and Natal sugars have been diverted to the Canadian market. On the other hand, increased supplies of British West Indies sugar have been consigned to Great Britain.

The total supplies of British preferential sugars available in 1932 exceeded those of the previous year by about 70,000 tons; entries into the United Kingdom and Canada were respectively about 100,000 tons more and 30,000 tons less than during 1931.

The sugar market during the past year has been a source of great disappointment to the producer practically all over the world, and in countries like Cuba and Java to such an extent that in the former the present crop has been restricted to 2,000,000 tons, and, in the latter, plantings to be begun in the near future (for the 1934 crop) are expected to be for a crop of not exceeding 500,000 tons. These are the two principal countries which produce sugar almost entirely for export, but more or less the same conditions obtain in countries having a home consumption of importance, such as, *e.g.*, the European beet countries and Formosa. The production of Formosa in 1931-32 was 1,147,000 tons; in 1932-33 it is estimated to be under 700,000 tons.

During the year I had conversations with Mr. F. E. Powell, the chairman of the International Sugar Council (Chadbourne Scheme), who desired to know whether Australia would co-operate with the countries adhering to the Chadbourne Agreement by adopting a much more ambitious scheme of restriction of production. Our discussions were very cordial, and after I had explained the position from Queensland's point of view I referred the matter to Brisbane. Although Mr. Powell was, I think, satisfied with my explanations regarding our present safeguards against increased production (*i.e.*, the peak-year scheme and the assignment of areas), I would urge that every precaution be taken to guard against the impression gaining ground in the United Kingdom or elsewhere that Queensland is not alive to the dangers of over-production. In this connection emphasis should be placed upon our desire rigidly to

enforce the present regulations against extension of the area under cultivation, with a view to assisting in the general desire to bring the industry back to an economic basis.

Appendix "B."—A chart indicating the movements of sugar prices during the year is given in Appendix B. From this it will be seen the record low price of 4s. 2d. per cwt. was recorded in April.

WOOL.

To all concerned, whether engaged in production, distribution, or consumption of wool, 1932 has in most cases been a most difficult and trying year.

In Great Britain, at the end of 1931, the imposition of 50 per cent. duties under the Abnormal Import Act gave a temporary stimulus to the market at the beginning of the year, and prices began to show some inclination to improve. In April, however, although the British Government confirmed its policy of protection, duties on woollen manufactured goods were reduced to 20 per cent. and 10 per cent. on wool yarns, and this led to further disturbance of trade in Great Britain without material benefit to those engaged in wool manufacture in Continental countries, where the revised duty, plus adverse exchange, was quite sufficient to continue to shut out imports in Great Britain.

It has rightly been regarded with satisfaction that, in spite of the world economic crisis, wool has gone steadily into consumption, and, unlike many other commodities, stocks have not up to now accumulated to any large extent. To countries still on the gold standard wool is a very cheap commodity, and it is not surprising therefore that countries like France, Germany, Belgium, and Holland have continued to absorb large quantities. Constant and rapid changes in the exchange value of sterling, however, have necessarily affected the market, and have been responsible for many minor fluctuations.

There has been an extremely poor demand for low crossbred wools, and one of the urgent needs of the industry at present would appear to be a new outlet for this class of material. There is a large accumulation of it available at low prices—a situation largely due to the reasonable values of the finer wools, which have popularised them at the expense of the lower qualities. It is not healthy for the industry when certain wools are in demand to the detriment of other sorts, and an increased call for coarse crossbreds would bring more stability to the trade.

There were seven series of sales in London during the year, and clearances proved reasonably good. Throughout the series there was keen competition from Continental countries, which, with the depreciated pound, found wool very cheap and apparently irresistible. France took an extraordinary amount, and Germany bought well in the crossbred sections. It was fairly late in the year when the home trade came into the market to its greatest extent.

Combing wools at the sales have remained fairly steady. Good 64's fleeces made about 18½d. clean scoured at the beginning of the year. They declined somewhat during the first few months, and touched their lowest point (16½d. to 17d.) at the May-June series. The July sales showed an upward trend again to about 18d., and they reached about 19d. at the September series. The improvement was partly the result of confidence inspired by the success of the British War Loan Conversion and the agreement between the Governments represented at the Conference at Lausanne. A slight fall was recorded at the November sales, when they settled down to 18½d.

Other qualities followed a similar course to that of 64's. At the beginning of the year 56's fine crossbreds made about 15d. clean scoured. At the May-June series they fell to about 12½d., rallying again to 15d. at the September sales, and maintaining that level at the last series in November.

The invention of new textile fibres during the year brought a strong protest from the Wool Textile Delegation against the use of the term "artificial wool." The delegation contended that no product deserving the name of wool, artificial or otherwise, existed apart from its growth on the sheep. They believed there was a serious danger of the public being misled by such terms, and urged that publicity should be restricted to the use of terms which could be scientifically justified and well understood.

The woolgrowers in Australia continue to be represented in London by Mr. Walter P. Devereux, and his weekly reports by cable and his fortnightly letters that are published in the Australian press keep those concerned in Australia in touch with the movements in markets and the course of events in Europe.

Wool Packs.—Experiments have been continued by the Wool Industries Research Association with a view to obtaining a suitable wool pack. Several experimental

packs made of Scottish jute, some impregnated with cellulose and others with rubber latex, were sent to Australia and submitted to a thorough examination on their return to this country. The packs treated with cellulose proved to be more satisfactory than those treated with rubber, but both are said to be promising. It is understood that the cost of the treatment is small, and the mechanical process is simple and inexpensive.

In addition to the determination of the efficiency of the "dopes," the experiments were carried out with a view to ascertaining whether the total weight of the pack could be materially reduced. It would appear, however, that no real saving can be made on the weight of the fabric if the strength and durability are to remain unimpaired. Further experiments are now being made with packs made of material obtained direct from Calcutta.

MEAT.

The estimated total consumption of beef, mutton, and lamb in the United Kingdom last year was—

	Tons.
Beef	1,288,529
Mutton and lamb	650,324
Total	1,938,853

Of this total, 56.28 per cent. was imported and 43.72 home-grown. Australia's contribution was 47,879 tons of beef and 57,802 tons of mutton and lamb, representing 9.60 per cent. of total importations and 5.45 per cent. of total consumption. The importations of chilled beef from Argentine amounted to 390,332 tons, which represents 35.47 per cent. of the total importations and 20.13 per cent. of the total consumption. New Zealand exported to this country last year 28,944 tons of beef and 195,793 tons of mutton and lamb, representing 20.41 per cent. of total importations and 11.59 per cent. of consumption.

According to a report issued recently by the Empire Marketing Board, there has for the past few years been a downward tendency in beef consumption, and a swing over to pork and mutton, both in countries which normally consume more beef than pork and in those where pork is always the more popular meat—chiefly North America, Germany, and some other countries of Northern Europe. Between 1925 and 1930 beef and veal consumption in the United States fell from 71 to 57 lb. per head, while pork and lard rose from 81 to 82 lb., and mutton and lamb from 5¼ to 6¼ lb. per head. In the United Kingdom beef consumption fell from 72 to 66 lb., while pig meat and mutton rose respectively from 39 to 43 lb. and from 26 to 28 lb. In Canada beef fell from 70 to 68 lb., while pork rose from 72½ to 81½ lb., and mutton and lamb from 5 to 7 lb.

Beef.—The imports of beef into the United Kingdom during the past three years were as follow:—

From—	Chilled Beef.			Frozen Beef.		
	1930.	1931.	1932.	1930.	1931.	1932.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
United States of America ..	..	..	..	45,959	60,297	47,466
Brazil	506,976	598,664	481,090	..	..	..
Uruguay	866,685	778,437	502,556	276,114	239,359	197,293
Argentine Republic	7,713,349	7,911,175	7,806,632	750,082	658,972	655,431
Australia	..	..	..	796,984	1,136,278	957,589
New Zealand	..	..	..	311,220	382,178	578,881
Other Countries	..	..	10,136	310,591	215,182	128,790
Totals	9,087,010	9,288,276	8,800,414	2,490,950	2,692,266	2,565,450

The quantity of frozen beef imported from Australia was less by 6,340 tons than in 1931, and approximately the same amount represents the difference in the total importations from all countries for the two years.

The year opened with Australian hinds at the low level of 3¼d. and crops at 2⅝d., at about which prices they remained, with slight variations, until the beginning of April, when the quotations rose to 4¼d. for hinds and 4d. for crops. This proved to be highest for the year, and from June onwards values again receded until December, when they stood at 3⅞d. for hinds and 3¼d. for crops.

South American chilled beef followed much the same course, opening at 5½d. for hinds and 2½d. for fores and closing at 5⅞d. and 3⅜d. for fores.

Several trial shipments of Australian chilled beef arrived in the United Kingdom during the year, and, although the results were inconclusive on the whole, they gave promise that with further experience and a more complete knowledge of the problem from the scientific aspect the present difficulties of shipping chilled beef will be overcome in the not far distant future.

Apart from chilling possibilities, the basic problems confronting the industry remain the same—namely, that in order to place our export industry on a sound basis we must (1) improve our herds; (2) shorten the transport conditions; (3) arrange a regular flow of beef to the British market; and (4) land our meat at competitive prices, and in a condition equal to chilled Argentine.

Mutton and Lamb.—The total quantity of mutton and lamb imported into the United Kingdom in 1932 was 348,212 tons, as compared with 355,364 tons in the previous year—a decrease of 7,152 tons. The shipments from New Zealand were increased by 25,305 tons, whilst those from Australia and South America were reduced by 18,665 tons and 14,409 tons respectively.

The following table shows the imports of frozen mutton and lamb from all sources during the past three years:—

From—	1930.	1931.	1932.
	Cwt.	Cwt.	Cwt.
Uruguay	423,327	284,300	163,690
Argentine Republic	1,452,043	1,553,309	1,385,720
Australia	810,170	1,529,345	1,156,034
New Zealand	3,292,842	3,469,761	3,915,865
Other Countries	406,526	270,564	342,938
Totals	6,384,908	7,107,279	6,964,247

Prices of mutton and lamb remained fairly steady until July, when there was a sudden drop, and values remained low until December, when there was an appreciable recovery. The following were the prices in London of the various descriptions at the beginning and end of the year:—

—	New Zealand Mutton.	New Zealand Lamb.	Argentine Mutton.	Argentine Lamb.	Australian Mutton.	Australian Lamb.
	d.	d.	d.	d.	d.	d.
1st January, 1932	3⅞	7¼	3½	5½	2⅝	5½
30th December, 1932	4½	6½	3¾	5½	3½	5⅝

Pork.—The number of pigs imported into this country in 1932 was 35,257, as compared with 68,993 in 1931. This decline is probably accounted for by the low prices realised, which are given below for porkers on a monthly average basis—as taken from the official price lists of the Imported Meat Trade Association:—

	Per lb. d.		Per lb. d.
January	4⅜	July	4½
February	4⅞	August	4⅝
March	5	September	5 1/16
April	5¼	October	5
May	5⅛	November	5⅛
June	4 11/16	December	5¾

There has been a marked improvement in quality, and grading is being carried out in a careful manner.

It has been suggested that it would be interesting to have competitions in Australia similar to those held in New Zealand, where Agricultural Associations have special export porker and baconer classes at their annual shows, when prizes are awarded for the most suitable export pigs. These are afterwards killed and shipped to the United Kingdom, where further prizes are awarded, and full reports issued both in writing and by photographs to each exhibitor.

The baconer class would particularly benefit by some further improvement, as complaints have been made that there is an excess of fat on this class of pig. If proper attention is given to producing a leanish baconer—say, with from ¾ in. to 1 in. of fat on the back for carcases up to 160 lb. range, and with a streak full of meat—a much larger export business with this country is possible, especially in view of the "bacon" restrictions now in force here.

Appreciation is expressed at the way in which the Brisbane Abattoir continues to turn out a clean, white, flesh-coloured carcase, which on average is finished better than many others seen from Australia.

Unfortunately, unless there is a very marked improvement in world commodity values, producers cannot look forward to greatly improved prices, although there is ample oportunity for marketing both baconers and porkers in increased quantities.

COTTON.

The outstanding event in the cotton industry of this country was the settlement, towards the end of the past year, of the disputes which had been prevalent for some years past.

In this, as in every year since 1920, the industry realised that it had to meet growing competition from India, Japan, and other countries, and it made strenuous efforts to overcome it. The latest is an organised attempt to secure increased preferential rates for British goods in British Dominions and Colonies.

Supplies of raw cotton were abundant, the imports for the year totalling 12,521,767 centals for 100 lb., as compared with 10,906,188 centals in 1931. The shipments from the United States to this country amounted to 7,251,783 centals, as against 4,421,810 centals in the previous year, while those from Egypt in 1932 were 2,410,929 centals, compared with 2,558,408 centals in 1931. The quantity imported from British countries totalled 1,332,502 centals, of which Africa contributed 780,800 centals and India 538,660 centals. Only a negligible quantity (about 189 bales) reached this country from Queensland.

The American cotton crop for the season 1931-32 was the second largest on record, the total of 16,877,000 bales being only surpassed in 1925, when 17,570,000 bales were marketed. Last season's crop was the product of 40,693,000 acres, as compared with 47,087,000 acres in 1925. The yield per acre was 201·2 lb., as against 147·7 lb. in the previous season and 155·0 lb. in 1929-30.

Prices generally tended low until August, when there was an upward turn in virtually all commodity prices. The best levels reached during this movement were not held, and a period of uncertainty followed, the war debts situation exercising a depressing influence until the middle of December, after which the markets had a somewhat stronger undertone. The spot price of middling American cotton at Liverpool was 5·34d. at the beginning of January, falling to 4·08d. on 2nd June, recovering to 7·20d. on 6th September, and relapsing to 5·29d. on 30th December.

The following table shows the price in pence per lb. of the two most widely used qualities of cotton on a late settling day of each month:—

1932.	Mid-American.	Fair Egyptian.	1932.	Mid-American.	Fair Egyptian.
	d.	d.		d.	d.
January	5·53	7·35	July	4·50	6·85
February	5·91	7·65	August	6·93	9·15
March	4·95	6·80	September	6·08	8·70
April	5·00	6·75	October	5·56	7·81
May	4·32	5·80	November	5·35	7·27
June	4·43	6·25	December	4·97	6·82

Cotton has not been cheaper for a decade. Ten years ago American growths were over 1s. per lb. and Egyptian varieties soared to over 2s. 6d. To-day cotton maintains its reputation as the cheapest and the most durable of light clothing, and has lost none of its popularity. The manufacturing industry, however, has suffered from over-production, the British trade to an exceptional extent, as its costs of production have been higher than those of its competitors—in some cases 25 per cent. more. Ten years ago Lancashire was responsible for 75 per cent. of the world's exports of cotton, and held predominance in 600 markets all over the world. Since then, owing chiefly to foreign competition, the number of operatives employed in the Lancashire mills has declined by no fewer than 150,000, and hundreds of mills have

been closed. Meanwhile, the Indian mills have doubled their output, and the Japanese cotton industry has made enormous strides, not only in India but in most of the other large cotton-consuming countries of the East.

As already stated, only 189 bales of Queensland cotton came on to this market last year. Generally speaking, they were not equal to the average quality of previous consignments, and appeared to be the tail-end of the crop. They found a ready sale, however, at market prices.

FURS.

Prices of all descriptions of furs remained at a very low level during the past year, and, so far as Australians were concerned, interest was centred in opossums. There was practically no market either here or on the Continent for either scrub wallaby, kangaroo swamp, rooks, coastal wallaby, or whiptails, and there is no immediate prospect of an improvement.

At the spring sales in April there was very little competition for Australian skins, and, although the best colours realised a slightly higher price than at the previous sales, there was an average reduction of 7½ per cent. During the summer but, with the financial crisis in America and the internal difficulties in Germany, the end of the year the American demand fell away, with the result that at the sales in October a large part of the offering was withdrawn—the skins sold fetching about the same price as at the April sales.

The stocks in London of Australian opossums at the end of the year were about 450,000, of which rather less than half were Queensland, which was not unduly large, but, with the financial crisis in America and the internal difficulties in Germany, the future prospects are so unsatisfactory that fur brokers and merchants here advise strongly against permission being given for the killing of opossums during 1933, as prices will undoubtedly prove unremunerative to trappers.

BUTTER.

The total imports of butter into the United Kingdom in 1932 amounted to 422,455 tons, as compared with 403,003 tons in 1931—an increase of 19,452 tons. Denmark is still the largest exporter with 129,183 tons. Australian shipments totalled 91,462 tons—an increase of 13,565 tons over the previous year. Queensland contributed 29,780 tons, as against 31,724 tons in 1931—a decline of 1,944 tons. The imports from New Zealand, amounting to 109,516 tons, exceeded the previous year's total of 96,280 tons by 13,236 tons.

The Board of Trade returns give the following figures of the importations of butter into the United Kingdom during the past two years:—

From—	Quantity.		Value.	
	1931.	1932.	1931.	1932.
	Cwt.	Cwt.	£	£
Soviet Union (Russia)	404,369	322,887	1,969,244	1,234,873
Finland	254,071	216,620	1,486,898	1,080,170
Estonia	125,384	83,153	666,984	337,916
Sweden	211,733	175,723	1,272,517	391,742
Denmark	2,466,070	2,583,664	15,639,722	13,924,927
Netherlands	96,117	46,998	598,349	248,616
Argentine Republic	373,934	390,445	2,047,282	1,661,995
Irish Free State	381,028	314,635	2,111,488	1,433,770
Australia	1,557,952	1,829,254	8,350,206	8,753,284
New Zealand	1,925,611	2,190,338	10,773,553	11,151,310
Other Countries	263,799	295,391	1,381,342	1,262,458
Totals	8,060,068	8,449,108	46,297,585	41,481,061

The fall in values the previous year has been accentuated during the period under review. During January the prices of Australian butter ranged between 90s. and 110s. per cwt. There was a slight improvement from February to April, when quotations again fell and remained, with some fluctuations, at between 88s. and 98s. until October, when there was a further decline until the end of the year, the closing prices being 78s. to 85s. for salted and 78s. to 88s. for unsalted.

Reports continue to be received of the excellent position which Queensland butter has secured in public favour. The quality and colour appeal to buyers of fancy quality, with the result that it has a somewhat higher selling capacity than the produce from other States on this market.

At the competition for Dominions butter, held in connection with the Annual Show of the British Dairy Farmers' Association in London last October, Queensland entries were successful in securing the whole of the prizes (five) in the "Salted" class, and first and third prizes in the "Unsalted."

A report of considerable value to the Queensland dairy industry has recently been issued by the Privy Council Medical Research, giving the results of exhaustive investigations which have been carried out into the vitamin content of Australian, New Zealand, and English butters.

Copies of this report have been forwarded by me to Queensland, but I consider it of sufficient importance to give here the following quotation:—

> "The result of chief public interest which emerges from the investigations just described is the high and uniform vitamin potency of Australian and New Zealand butters. The systematic observations recorded here, together with the published results of isolated tests by others, leave no doubt that the Australian and New Zealand butters when they reach the consumer in this country contain both vitamin A and vitamin D to a value as high as that of butters produced in Great Britain or elsewhere in Europe. It is known that the vitamin content, and especially the vitamin D content, of milk and butter produced in northern latitudes declines in winter, when sunlight is deficient and the herds are stall-fed, and that it rises again in the summer. The Australian and New Zealand butters do not fall short of the best summer butters here, or even of butters produced from cows whose diet has been fortified by an artificial supply of the fat-soluble vitamins A and D. The results now presented, moreover, show that the methods of production and handling, and the delay in transit, have a negligible influence upon the vitamin content of butters as they reach the consumer.
>
> "This good and uniform potency of the Australian and New Zealand butters makes them a particularly valuable source of the vitamins A and D for the British population, and especially during the winter season, when the vitamin potency of home or other European butters may be low.
>
> "It has been shown that the racial origin of the dairy cows providing the butter has no significant effect upon the vitamin content, and it has been shown also that the butters from different parts of Australia are closely equivalent in value.
>
> "It is satisfactory to find that these vitamins in butter have remarkable stability during cold storage. Not only is there no appreciable loss of potency during the weeks of transit by sea, but in several cases no notable loss could be detected even after periods up to two years, and this stability was found whether the butter was stored in large or small quantities, or, again, whether the butter had been prepared from sweet or acid cream. No fear need be entertained, therefore, that the vitamin content of Australian and New Zealand butters is likely to diminish during the period of two or three months which usually elapses between their first preparation and their final consumption in this country."

I recently visited a large industrial centre in the County of Durham, in Northern England, and took the opportunity of studying retail conditions in the sale of primary products. In view of the serious fall in the price of our butter, I was particularly interested in the retail selling prices of this commodity, and in ascertaining the relative demand for Empire and foreign butters in a typical industrial centre of Northern England, where unemployment was said to be approximately 50 per cent. of the adult population. Needless to say I was much surprised to find Danish butter on sale at practically every grocer's store and prominently advertised as such, although the selling price was from 2d. to 3d. per lb. higher than for the Empire article. In a few shops New Zealand butter was on sale, but in no single case could I see Australian butter on sale as such. On inquiry, I did discover Australian butter being sold, although not advertised, at a small store, and in conversation with the manager he said the only reason he could give for Danish butter being in such large local demand was because this article had been sold to the fathers and mothers of those of the present generation of housewives, and this in spite of the fact (as he admitted) that Australian butter was so much cheaper and generally of equal or better quality and value. He pointed to the fact that Danish butter also contained more moisture, for which the purchaser had to pay. The retail prices I found were:—

Danish	11d. to 1s. per lb.
Australian and New Zealand ..	9d. to 10d. per lb.

Wood Taint in Butter.—There have been practically no complaints of wood taint from importers of Queensland butter during the past year. Although consignments of butter still arrive in which wood taint can be detected, on the whole it has been very little in evidence. A quantity of butter has been received during the season packed in Queensland Kauri timber, and on no occasion has there been any marked taint in butter thus packed.

Experiments have also been made with the insides of boxes treated with a casein solution, and, so far as it has been possible to judge, this method of dealing with the problem has been very satisfactory.

CHEESE.

The total imports of cheese into the United Kingdom during the past year amounted to 150,327 tons, as compared with 144,289 tons in 1931—an increase of 6,038 tons. New Zealand exceeded her previous year's shipments by over 6,000 tons, with a total of 92,637 tons. Although the exports from the Commonwealth exceeded the previous year's total by 275 tons, Queensland's contribution of 1,926 tons was 300 tons less than in 1931.

The following table, issued by the Board of Trade, shows the quantity and value of cheese imported into the United Kingdom during the past three years:—

From—	1930.		1931.		1932.	
	Cwt.	£	Cwt.	£	Cwt.	£
Netherlands	183,076	673,741	168,219	573,934	169,932	454,609
Italy	144,650	692,022	131,783	637,034	106,094	449,009
Australia	47,685	174,439	68,036	193,348	73,534	211,975
New Zealand	1,960,901	7,821,634	1,732,620	4,947,571	1,852,743	5,445,397
Canada	678,294	2,699,918	706,725	2,322,269	747,272	2,265,429
Other Countries	97,710	541,220	78,411	388,551	56,974	273,320
Totals	3,112,316	12,602,974	2,885,794	9,062,707	3,006,549	9,099,739

The arrivals of Queensland cheese have been somewhat irregular. Commencing with the months of May and June, for five weeks in succession there was none available on the market, and supplies continued very intermittent to the close of the year.

Price levels, as in the case of butter and other primary products, suffered severely, quotations for Australian cheese fluctuating between 48s. and 63s., the higher figure being realised in February, and the lower at the end of December.

The standard of Queensland cheese was well maintained on the whole, but, according to reports received at this Office, the quality of the output of some of our factories is capable of improvement.

It is satisfactory to report that the Downs Co-operative Dairy Association, Lilyvale, was, for the second year in succession, successful in securing the premier award, which includes the Hansen Challenge Trophy, for the best cheese in the competition for Dominion cheese held in connection with the Annual British Dairy Farmers' Association Show at the Agricultural Hall, London.

EGGS.

The past season is considered to have been a successful one from both the shippers and importers' points of view. Prices did not reach such high levels as in certain periods of the previous year, but, on the other hand, fluctuations were less violent. The producers should, it is thought, be reasonably satisfied with the results, having regard to the much lower prices that have been ruling for other dairy produce and the drop in consumption figures.

Queensland eggs enjoyed a particularly good demand at prices, on an average, about 6d. above those obtained for other Australians, on account of their exceptionally fine quality and selection.

The supplies of imported eggs into the United Kingdom during 1932 fell off considerably, the total decrease as compared with the previous year being over 700,000,000. The imposition of a 10 per cent. *ad valorem* duty was largely responsible for the drop in foreign consignments from Denmark, Holland, Poland, and Belgium. On the other hand, the Australian imports increased by 65·6 per cent., the total reaching 1,514,708 long hundreds, as compared with 918,206 long hundreds in 1931 and 554,653 long hundreds in 1930.

The fact that such a largely increased quantity of Australian eggs should have been so readily absorbed by the English market clearly indicates their popularity.

With the exception of excessive damage sustained in some of the consignments of the 16-lb. pack, which was investigated and reported upon to the Egg Board by this Office, the Queensland product maintained its excellent reputation for quality, grading, and packing.

Under the Ottawa Agreements Australian eggs retain free entry to the United Kingdom market, the duties on foreign eggs being charged on a flat-rate basis—e.g., first-grade eggs now pay duty at the rate of 1s. 9d. per 120 eggs whatever the market price.

EGG PULP.

In November last I took occasion to be present at the inspection of the first consignment of Australian frozen egg pulp, which had been manufactured in Melbourne by a new vacuum method. The consignment had been given wide publicity, and the considerable interest aroused was evidenced by the large gathering of trade representatives as well as Commonwealth and State officials who attended the demonstration.

It is well known that egg production in the Commonwealth has seen a remarkable expansion in the last few years, and in view of the increasing export of eggs to the United Kingdom from other countries, and the steady growth of supplies from home production, the question of securing a market for Australian egg pulp as a necessary adjunct to the export of shell eggs has become a matter of considerable importance. The Chinese production has practically dominated the market in egg pulp for years past, the bulk of supplies being used by bakers and confectioners, so that the Australian article is called upon to compete with a powerful influence in this market.

The above shipment was in fine condition both in quality and packing. The pulp was contained in 40-lb. tins, appropriately and attractively labelled, and each tin was protected by a strong waterproof carton—in which respect it is understood to meet with the requirements of the trade. The contents were well emulsified and rich in colour, and the general opinion of those present was that the consignment greatly improved the prospects of securing favourable recognition of the Australian production on the London market, the only difficulty which arises being whether regular and uniformly good consignments can be sent to this market throughout the year—in season and out.

CANNED PINEAPPLES.

The quantity of canned pineapples imported into the United Kingdom in 1932 was 48,410 tons, as compared with 38,438 tons in 1931.

The imports from foreign countries were nearly 40 per cent. less than in the previous year, probably owing to the 15 per cent. tariff. The position of the Hawaiian trade has been very difficult, and small quantities only have been sold at from 9s. 6d. to 10s. per dozen for Standard. The 1931 Hawaiian pack was about 12,000,000 cases, and owing to the world trade depression a very large quantity was carried over. It is understood that packers agreed to curtail the 1932 pack to 6,000,000 cases. The high prices asked have restricted trade considerably.

About 3,000 to 4,000 cases of pines came to this market from Formosa last year, but it is reported that possibly 50,000 will be available during the present season at prices ranging from 5s. 10d. per dozen for Standard to 6s. 6d. per dozen for Extras. These are, of course, liable to the 15 per cent. duty.

The market price for sliced Singapore pines was 5s. 9d. per dozen, duty paid, for 30-oz. tins. Small tins were obtainable retail for 3½d. and 4d.

The bulk of the trade in Queensland pineapples was done in 30-oz. tins, which were marketed at about 7s. 6d. per dozen for the winter pack and 8s. for the summer pack. There is not a great demand for 20-oz. tins, the prices for which ranged from 4s. to 5s. per dozen. A fair quantity of the 16-oz. size was sold at from 4s. to 5s. per dozen.

The general quality of our pines was satisfactory and met the requirements of the trade.

FRESH PINEAPPLES.

A small trial consignment of Queensland fresh pineapples was shipped per s.s "Oronsay," which reached London early in November, and was duly inspected by me.

Although this parcel was equal to the best results obtained in previous experimental shipments from Queensland, the fruit could not be compared, from a marketing standpoint, with that shipped to this country from the Azores. The Azores pines sell at from 1s. 9d. to 2s. 6d. each (wholesale), whereas the Queensland fruit is not worth more than 9d. each, which was the price at which this trial consignment was eventually sold to a small buyer.

The pines from the Azores are grown under glass six days' voyage from England, and are shipped as ordinary stowage. They are bright-coloured and fresh-looking, with a firm green foliage at the crown, and are packed in clean wood wool and readily displayed. The Queensland fruit, on the other hand, was packed in a fibre material which had to be brushed and cleaned off before it could be examined. The pines were a dull brown in colour, a few withered leaves only remained of the top growth, and much of the original flavour was lost.

The pineapple is looked upon on this market as a decorative fruit, and, as a selling factor, its appearance is perhaps of equal importance to the flavour, and, unless Queensland pines can be landed here with an undamaged crown and a good colour, it is not likely that they will be able to compete successfully with those from the Azores.

APPLES.

The experimental shipment of 500 cases of Queensland apples forwarded by the Summit Fruitgrowers' Co-operative Association, Limited, in 1931 was followed last year by another consignment of over 1,100 cases. These were comprised chiefly of "Granny Smiths," "Dunns," and "King Davids," and by arrangement with Messrs. George Monro, Limited, of Covent Garden, I was able to see the fruit soon after its arrival in the market. The condition of the apples was considered, on the whole, to be fairly satisfactory, but, unfortunately, many of the "Granny Smiths" were affected by "Bitter Pit." In the absence of any scientific conclusion as to the cause of "Bitter Pit," various opinions are held regarding the origin of this disease. One merchant with long experience in the trade informed me that the defect was more prevalent with the early-picking crops, and that as the season advances the fault becomes less pronounced. In support of this contention, it was stated that similar trouble was experienced with "Cox's Orange Pippin" from New Zealand until the export of this variety was delayed until later in the year.

A certain amount of wastage occurred through the apples being too tightly packed, particularly those uppermost in the case, which had been cut or bruised by the sharp edges of the lid. The boxes from New Zealand, Western Australia, and some of the other States are lined with corrugated paper, which protects the fruit from direct contact with the wood of the case. This system, I believe, is not adopted in Queensland.

The "Dunns" showed traces of having been stored for some time before packing, as in many instances they had become soft and the skin appeared slightly shrivelled. In respect to this latter condition, I pointed out as a probable cause the abnormally hot weather that was experienced in Queensland at about the time the fruit was being packed.

It is the opinion generally that with the results of this further experiment to assist them the producers should feel confident to export substantially larger quantities in future, and, provided strict attention is devoted to the selection, grading, and packing, Queensland should become, along with her sister States, a regular contributor to the requirements of this market.

SNAKEBITE AND ITS TREATMENT.

The marks of a snakebite were two punctures, sometimes with two or more scratches. In treating a bite on the hand the first thing was to apply a ligature above the elbow without a second's delay. Next, the place should be wiped and the punctures cut through (along and never across the limb) with a piece of broken glass or a sharp blade. Crystals or permanganate of potash should then be rubbed freely into the cut. After an hour the ligature (which should be twisted with a stick very tightly) must be loosened for 30 seconds. This allowed fresh blood to flow, and unless it was done the flesh might mortify. The loosening and retying of the ligature should be repeated every 15 minutes for another hour. When the ligature was put on within half a minute of being bitten recovery was practically assured.—J. R. Kinghorn (Australian Museum) in the "Sydney Morning Herald."

PRODUCTION RECORDING.

List of cows and heifers officially tested by officers of the Department of Agriculture and Stock which have qualified for entry into the Advanced Register of the Herd Book of the Australian Illawarra Shorthorn Society, the Jersey Cattle Society, and the Friesian Cattle Society, production charts for which were compiled for the month of August, 1933 (273 days period unless otherwise stated):—

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORNS.				
MATURE COWS (OVER 5 YEARS), STANDARD 350 LB.				
Heather of Trevor Hill	C. O'Sullivan, Greenmount	13,482·47	577·492	Prince of Braemar
Lucky II. of Wendella	J. Phillips, Greenview	12,310·86	507·129	Daisy's Westbridge of Glenthorn
Broady 2nd of Rosemount	J. Buckley, Rosehill	10,087	440·869	Gertun of Greyleigh
Princess 7th of Oakvilla	H. Marquardt, Chelmer	11,505·13	437·572	Victory of Greyleigh
Duchess II. of Trevor Hill	G. Gwynne, Umbiram	11,396·5	431·723	Exchange of Balmoral
SENIOR, 3 YEARS OLD (OVER 3½ YEARS), STANDARD 290 LB.				
Rosenthal's Fuchsia 12th	S. Mitchell, Rosenthal, Warwick	7,945·5	325·046	Dividend of Rosenthal
JUNIOR, 3 YEARS OLD (UNDER 3½ YEARS), STANDARD 270 LB.				
Rose of Lynfield	F. E. Birt, Sexton	6,819·5	284·306	Royal Monarch of Blacklands
SENIOR, 2 YEARS OLD (OVER 2½ YEARS), STANDARD 250 LB.				
Duchess of Kalinga	Honey and Braithwaite, Boat Mountain	7,244·97	297·105	Duchess Jellicoe of Fairfield
Fairlie Beauty 20th	C. B. Mitchell, Warwick	6,902·5	295·549	Fairlie Treasurer
Penros Ruth	A. Sandilands, Wildash	6,797·5	261·189	Bonnie Charmer of Coral Brae
JUNIOR, 2 YEARS OLD (UNDER 2½ YEARS), STANDARD 230 LB.				
College Sunlight	Queensland Agricultural High School and College, Gatton	8,108·55	318·788	Fusey's Kitchener of Hillview
Penrhos Evelyn	A. Sandilands, Wildash	6,530·75	253·335	Bonnie Charmer of Coral Brae
Euroa Velvet	H. L. Lindenmayer, Binjour	6,278	237·626	Swagman of Clonagan

JERSEY.

Mature Cow (over 5 Years), Standard 350 lb.

Newhill's Noble Rosina	J. N. Robinson and Sons, Maleny	5,771·2	361·984	Oxford Golden Noble

Senior, 3 Years Old (over 3½ Years), Standard 290 lb.

Newhill's Golden Queen	J. N. Robinson and Sons, Maleny	4,955	306·013	Prince Harry of Newhills

Senior, 2 Years Old (over 2½ Years), Standard 250 lb.

Bremerside Golden Buttercup	B. J. Jensen, Rosevale	6,047	354·89	Kelvinside Noble Chieftain
Trinity Popcorn 2nd	A. H. O. Koppen, Peeramon	5,007·15	285·562	Trinity Perfection

Junior, 2 Years Old (under 2½ Years), Standard 230 lb.

Bellefaire Bonaparte Bon Bellette	F. J. Cox, Imbil	6,783·1	417·183	Sybil's Bonaparte of Rosel
Trecarne Jean	R. A. Slaughter, Clifton	7,628·25	375·253	Mascot of Brasseldale
Trinity Lady Flower	A. H. O. Koppen, Peeramon	5,874·05	326·618	Trinity Perfection
Lucy of Billabong	J. Mollenhauer, Moffatdale	5,377·62	280·887	Premier of Calton
Brooklodge Melba	J. Cummings, Upper Nerang	4,831·97	270·687	Carlyle Empire Songster
Brooklodge Stella	J. Cummings, Upper Nerang	4,140·74	262·718	Carlyle Empire Songster

FRIESIAN.

Senior, 2 Years Old (over 2½ Years), Standard 250 lb.

Oakland's Nelly Rock	W. Richter, Tingoora	11,633·45	437·346	Pied Rock

A QUEENSLANDER ABROAD.

TRAVELLING RESEARCH SCHOLAR'S REPORT.

Mr. L. Gordon Miles, M.Sc., a young officer of the Department of Agriculture and Stock, who was awarded a travelling research scholarship in Plant Genetics, and who is now pursuing his studies at the Cornell University, Ithaca, N.Y., U.S.A., makes the following interesting observations in the course of a report to the Under Secretary (Mr. E. Graham).

VIRGINIA, North Carolina, and South Carolina were visited with the object of seeing something of the cotton and tobacco breeding work in those States.

The places included in my tour were Oxford, N.C. (Tobacco Sub-station), Durham, N.C. (Duke University), Raleigh, N.C. (North Carolina State College of Agriculture), Florence, S.C. (Pee Dee Experiment Station), Hartsville, S.C. (Coker Pedigreed Seed Co.), and Chatham Va. (Tobacco Sub-station). In Virginia and North Carolina the crops were not as yet very far along, while farther South, especially in the neighbourhood of Florence and Hartsville S.C., the tobacco was well along towards maturity, and the cotton was well into flower.

At Oxford the soil was typical of that of a large section of the so-called Piedmont and Coastal Plains areas of the South, being a light-grey sandy soil of relatively low fertility, underlain by clay. All tobacco and cotton is grown with the aid of heavy applications of artificial manure, a complete fertilizer being used. Where tobacco is grown on patches of heavier soil, or where legumes have been ploughed under, high yields are obtained, but growth is rank and quality poor; where no fertilizer is used on the sandy soils, practically no crop results. Plants are commonly spaced 2 ft. in the rows, which are 4 ft. apart.

Magnesium was found to be a limiting factor with tobacco in this area, its deficiency causing the disease known as Sand Drown. Application of Mg. SO_4 in lots of up to 80 lb. per acre are commonly made. A favourable response to chlorine in small amounts is also noticed, though larger applications are detrimental to "burn." The work in progress was largely a continuation of former nutritional studies involving a large number of elements and fertilizer combinations. Varietal trials were also being continued over a series of years, and also rotational experiments involving in addition to tobacco, corn, cotton, legumes, and weeds. Little or no breeding work was being conducted at the time, though selection had been practised for a number of years for better yield and quality, and greater uniformity. One or two strains resistant to Thielavia basicola (black root-rot) had also been developed.

Blue mould, here, as elsewhere in the Carolinas, had been little more than a name before 1932, but in this year it became a serious seed-bed pest; vigorous seedlings put out from infected seed-beds, however, apparently recovered, and carried through all right.

Raleigh, my next stop, is the capital of North Carolina, and is located just east of Durham in a flat and rather infertile area. Breeding work at the Agricultural College there consisted mostly of selection out of previously existing varieties—e.g., considerable work had been done on the Mexican Big Boll variety of cotton, and up to 1930 the strain Mexican 6-1-9 was the highest yielding variety over most of the State; by 1933 the newer selections 58-14 and 128 were leading in the Piedmont section, and 58 and 87 in the Coastal Plains. The general recommendations of the station at the present time are Mexican strains for the rolling country of the Piedmont, Coker Cleveland varieties (developed by the Coker Seed Co. at Hartsville S.C.) for the lighter, well-drained soils of the Coastal Plains, and the wilt-resistant varieties, Clevewilt (Coker), and Dixie Triumph for wilt lands. These varieties, under suitable conditions, average $1\frac{1}{16}$ in. staple, and yield over 400 lb. of lint cotton to the acre. The Carolina-Foster varieties are early, light-foliaged, long staple cottons which are recommended only for heavier, poorly drained coastal soils. They generally command a premium because of their $1\frac{1}{8}$ to $1\frac{3}{16}$ in. staple.

Considerable energy has recently been devoted to the improvement of staple length of Carolina cottons. In the past, North Carolina has been producing a surplus of low-staple cotton, while the local market demands much more of the higher staple lengths. For instance, in 1929, the local market consumed only 28 per cent. $\frac{7}{8}$-in. staple and lower, 72 per cent. of the total bales used running higher. The state produced, however, nearly 73 per cent. of the lower staple lengths and only 27 per cent. of the higher. That improvement has been effected is shown by the fact that in 1928 only 20 per cent. of the total crop was $1\frac{1}{8}$ in. or higher, while in

1932, 66 per cent. fell into these classes. These improvements are due to better cultural methods, to continuous selection on the part of breeders and seedsmen, coupled with the more general use of improved seed by the farmers, and to prevention of mixtures at the gin. Where farmers wish to obtain their own seed pure from a public gin for planting, the seed roll is dropped, the gin thoroughly cleaned, and the seed caught on the floor. The Extension Department is keenly interested at the time in establishing "one-variety communities," in which all farmers agree to grow seed of the one variety which has been recommended by the College as best for that locality. With careful cultivation, a uniform, high-grade product results, and the troubles of gin mixtures are eliminated.

Under the existing boll weevil conditions, relatively heavy seeding is adopted, hills being generally spaced 8 to 12 in. apart, and averaging two plants per hill. Planting is done in ridges; good results have recently been obtained using hand "cotton hill droppers" of the type sold by Cole Manufacturing Co., Charlotte N.C., or W. F. Covington, Headland Ala. A good stand is obtained, and the work of thinning out is reduced.

At Florence S.C., I visited the Pee Dee Experiment Station and also the office of the Clemson College (South Carolina State) Extension Staff, and was afterwards driven around the surrounding farming country, and saw at close quarters a number of cotton and tobacco farms. One farm in particular had a beautiful stand of tobacco, the whole acreage being planted to one variety—Coker's new Gold Dollar. The dry weather had, however, caused premature yellowing of the lower leaves, and a couple of primings had been made. We also inspected the flue-curing barns, which were in operation at the time, and of which there were ten or a dozen on the farm. The farm supplied all the wood necessary for the fires. A point worth noting was the careful manner in which strips of timber had been left to act as wind-breaks for the crop.

At the Pee Dee Station the blue mould disease of tobacco was occupying the thoughts of the staff very much at the time. Reported only once prior to 1932, it appeared in the seed-beds again in 1932 and 1933. Last year the trouble was restricted to the seed-bed, while this year a number of growers have had considerable trouble in the field. They hesitate to attribute the death of plants in the field directly to the blue mould fungus, and so far have been unable to obtain spores on dead or dying plants in the field. The symptoms, however, looked to me very much like those attributed to blue mould in the field in Australia, and it looks to me as if the disease may yet become a major factor with them here, as it is with us. Some growers obtained excellent stands in spite of heavy seed-bed infection, while others had to replant four or five times in some cases, with the result that a very poor stand was obtained.

The cotton work consisted mostly of physiological, fertilizer, and cultural studies. Cotton is commonly planted here after legumes, and tobacco after weeds. On the light, sandy soils of this area, Calcium arsenate dust (used for boll weevil control) has a cumulative deleterious effect, especially upon following oats and cow-peas.

At Hartsville S.C., the Coker Seed Co. are doing, and have done, probably the best crop-breeding work of any institution in these Southern States.

Here again the major problems in cotton breeding have been those of improving the staple length and spinning quality, and inducing a heavy, early set of bolls, in order to combat the boll weevil. The production of Farm Relief cotton in about 1930 was the result of a cross between a strain of Lightning Express, which possessed the characters earliness, thin foliage, and a staple length of $1\frac{3}{16}$ in., and a Cleveland line possessing large round bolls, storm resistance, good general vigour, and a staple length of $1\frac{1}{16}$ in. The desired progenies first appeared uniform in F_7 (1928); they combined the thin foliage and earliness of Lightning Express with the boll size and storm resistance of Cleveland, the staple being of good spinning quality, and averaging a good $1\frac{1}{16}$ in. This cotton has hardly been out three years, but has proven very popular over a wide area of the State.

Work has, for many years, been centred on the Cleveland variety, and a number of valuable strains have been evolved by plant-to-row selection. Of these, the Coker Cleveland 5 is the most famous, while No. 884 is an earlier type, but also vigorous and high yielding. Coker Cleveland cottons have won the State-wide 5-acre contests continuously since their inception in 1926. The Coker-Wilds strains were selected for long staple, the resultant lines averaging $1\frac{1}{16}$ in. to $1\frac{3}{16}$ in. staple length. Other long staple varieties have been bred from Delfos and other Delta types, and now go by the name of Coker-Foster, and Delta-type Webber. Successful work has also been done in developing wilt resistant strains, the station being fortunate in possessing some badly infected wilt land. Attention passed from the old Dixie-Triumph lines (out of which they obtained Super-seven) to the better Cleveland types,

and recently the highly resistant Clevewilt has been produced. The problem of physiological strains of the organism has now arisen, and the breeding problem is thus further complicated. Considerable faith was expressed in a cross between the two resistant varieties, Super-seven, and Lightning Express. The F_2 progeny strangely shows a large percentage of susceptibility.

The firm's main work in tobacco has been restricted to the testing out of the best available varieties of bright flue-cured leaf tobacco, followed by pedigree selection from the best. In 1928, thirteen leading varieties were tested, and Jamaica Wrapper and Bonanza found to be the best for local conditions. Single plant selections were made from these varieties, and plant-rows set out the following year. One strain of Jamaica Wrapper proved outstanding over the following three-year period, and this, Coker's first pedigreed strain of tobacco was released under the name of Gold Dollar. The tobacco men here are convinced that there is scope for considerable breeding work on cigarette tobaccos; many of the varieties commercially grown lack uniformity. The problem of selection in tobacco is intensified by the fact that all strains are given the same curing treatment, whereas the quality in some may be best developed by a slightly different curing process from that in others. Average curing conditions have to be aimed at, and selection for quality on the basis of one year's test must not be too rigid.

Small grain work has also been carried on for many years, greatest success being achieved in the production of cold resistant and smut resistant oats, both for hay and for grain purposes.

EFFICIENCY ON THE FARM.

Farm efficiency is applied methodical common sense in the running and management of the farm.

It is, no doubt, a very easy matter to find the faulty or inefficient methods of neighbours, but to put the finger on our own is the thing that we must try to do, and this is one of the objects of the Agricultural Bureau.

Firstly dealing with machinery, many farmers are too busy or hard pushed for time ever to read the instruction book. Careful study of the instruction book will pay very big dividends in the life of a machine.

With internal combustion engines, use only the best oil and greases, for when a farmer has to pay several hundreds of pounds for a machine, it is worth while to put that little difference in price between poor and good lubrication into that machine, for in all cases good lubrication pays.

See that the fuel—whether for car, engine, or tractor—is strained. This, in the long run, will prove a time saver. One may go perhaps for months without trouble through not straining the fuel, and then, perhaps, miss an important engagement, or lose several hours with blocked fuel pipes.

Always clean gauze strainers at certain periods, for even with the best strainers sediments get through.

When emptying oil tins or drums, be careful of the last drop, for it is usually in this that the water and rubbish collects, and unless strained may ruin expensive bearings.

Keep your eyes and ears open, and if you see or hear something wrong, stop and remedy it unless it is trivial, even then it pays, for "a stitch in time saves nine," and nothing is surer than that adage when applied to fast moving machinery.

When feeding cows, pigs, horses, &c., always have the feeding utensils in a convenient place.

Do not leave implements in a far corner of the farm; they may be needed later, and time will be lost in getting any parts or tools that are required.

Take care of any borrowed article and do not forget to return it in the stipulated time or when finished with. It is easier done then than when in the middle of an important job.

Efficiency can be practised in many other ways on the farm, and these are only a few which I have noted. There are many others, and they will all prove time and labour saving.—A. McCallum in a paper at a recent farmers' conference at Morchard, S.A. (South Australia Bureau of Agriculture.)

FEEDING PIGS.

Freshness and palatability are essential in all pig rations in order to ensure greater digestibility, quicker growth, and maximum returns. Be sure the food is always fresh and appetising.

As indicating the phase of pig-keeping associated with economy of production, recent records from Great Britain indicate that in a series of feeding experiments one sow's litter of nine—a first litter—averaged 200 lb. each at twenty weeks' old. Right up to this stage they averaged 1 lb. gain for a little less than 3 lb. of food. In spite of low prices they should show a satisfactory profit.

Only balanced rations fed on correct lines can produce the standard pig required by the trade to-day. The feeding of pigs along ordinary lines, in which they are given as much milk as can be spared, and in the absence of a sufficient supply the milk is adulterated with water to as much as 50 per cent., is quite uneconomical.

Unbalanced, unreliable, and varied methods of feeding lead to endless trouble. Greater efficiency in feeding and the use of economical balanced rations leads to success and a much greater margin of profit.

The mineral content of the pig's ration should not be overlooked. Experiments have proved on numerous occasions that the number of pigs produced at birth and the strength and vitality of litters can be vastly improved by careful attention to the feeding. Minerals may be given in the form of a powder mixed with the food—in which case each animal receives the proper amount—or they may be provided in the form of a lick which the animal can take as required. In the absence of other minerals a small quantity of table salt added to the rations will improve them and be beneficial to the animal. Excess of salt is dangerous and should be avoided. Iodised mineral salts or mixtures are nowadays available on most markets and are strongly recommended.

A pig breeder writes that he has known of a pig at about six months of age to make no increase in weight for a week or more, and then to gain as much as 20 lb. in the following week. He asks the cause. The answer is that this is probably due to digestive disturbances caused by heavy feeding. It is quite common to have poor gains in the last week or so of special feeding due to indigestion and bowel disorders. The feeding of smaller quantities of food at more frequent and regular periods is suggested as preferable to overfeeding, with attendant risks of loss in weight.

Health, vigour, and bloom represent three very desirable characteristics in the development of profitable pigs. They need to be healthy and vigorous in order to have that bloom which is so desirable. Pigs that are unhealthy rarely show evidences of vigour, and they invariably lack bloom, the external evidence of a healthy, active circulation of rich red blood.

A report from New Zealand reads that records of experiments there indicate that 3 gallons of skim milk plus 1 lb. of concentrates made up of meat meal (62 per cent. protein) and pollard produces 1 lb. of pork in healthy, well-grown pigs; with rations of that make up a 60-80 lb. porker is possible in sixteen weeks at a cost of approximately 5s. for each pig for concentrates used. Pigs produced on dairy farms along these lines should show a much greater margin of profit than those animals fed entirely upon skim milk in the absence of concentrates.

Statistical data for New Zealand indicates that under the ordinary methods of feeding where no attention is given to the inclusion of protein rich concentrates in the ration, it takes 10 gallons of skim milk to produce 1 lb. of pork. The question that arises is what is skim milk worth under these conditions as compared with the efficient use of concentrates with the milk?

Pedigree, plus performance, backed up by efficient feeding and management, should be the ideal of the pig-farmer. There is still a profit in pigs if they are handled correctly.

Answers to Correspondents.

BOTANY.

Nut Grass.

F.H.S. (Proserpine)—

It is rather difficult to tell some of the sedges allied to nut grass in the absence of seed heads. However, I think there is no doubt that the specimen you send represents the common Nut Grass (*Cyperus rotundus*), that is such a pest of cultivation in Queensland. Regarding eradication, on the whole poisonous sprays have proved of little or no value unless several applications are made. Experience has shown, however, that small patches can be eradicated by the application of cheap grade salt at the rate of one-quarter pound per square foot, either dry or in the form of brine. Waste brine, as obtainable from butchers, hide stores, &c., is quite suitable. Personally, we have found that the best method of eradication in small patches is to keep the green growth constantly cut off. This, we think, is better than forking the land over. The nut grass tuber is a storehouse of nutriment for the young shoots. The food material stored in the tuber is used in the formation of the young shoot. Cut this off regularly and the tuber will eventually become exhausted. Another point is that the formation of fresh tubers is dependent upon the leaves, and if these are not allowed to grow fresh tubers cannot be formed and the old ones must die of exhaustion. We have seen in the Queensland Press at odd times a recommendation to the effect that small patches should be covered with galvanised iron or some such material, but this is of no value whatever as the nut grass tubers simply remain dormant and spring into active life as soon as the covering is removed. Pigs and poultry, including ducks, of course, do good work in keeping the weed in check in small areas, and on confined places will, in a few years, completely eradicate it. You will find Mr. Summerville's note on Two Insect Enemies of Nut Grass in this issue of the Journal of particular interest.

Milk Weed—Caustic Creeper.

C.F.H. (Alpha)—

The specimen is not the common Caustic Creeper, but the Milk Weed (*Pratia erecta*), very common in parts of the Darling Downs and Western Queensland. It belongs to a poisonous family of plants and is generally regarded as definitely poisonous to stock though no feeding tests have been carried out with it. The Caustic Weed or Caustic Creeper (*Euphorbia Drummondii*) is somewhat similar in appearance but has much smaller leaves. "The Weeds and Suspected Poisonous Plants of Queensland," by the late F. M. Bailey, is obtainable from this office, price 5s. 3d. postage paid.

Burr Trefoil.

R. McM. (Woolooga)—

The specimen is the Burr Trefoil (*Medicago denticulata*), a native of Europe, but now naturalised in most warm temperature countries. It is very common in some parts of Queensland in the winter and early spring months, dying off on the approach of summer. It is a valuable fodder for dairy cattle, but if eaten in any quantity is inclined to cause "bloat." On the whole, we think cattle prefer the plant when it is cut and wilted or when it is dying off. Before the plant dies it bears great quantities of seed in the form of small, rather flat, twisted burrs. These, however, are quite nutritious and readily eaten by stock. Seed is not stocked by nurserymen, but once it gets on a place it generally spreads naturally by stock carrying it about or voiding the seeds.

Cattle Bush—A Common Weed.

A. M. McM. (Springsure)—

1. *Pittosporum phillyræoides*, Cattle Bush. We were very glad to have your notes on this plant. It is a small tree very widely spread in Australia, being found in all the States except Tasmania. It has been called at times Poison Berry Tree, probably owing to the bitter taste of the seeds; but Mr. Tepper, a well known botanist and naturalist in South Australia, and

a very reliable observer, said that the seeds, although bitter to the taste, were used by the aborigines in the interior as food, being pounded into flour. The plant is said to be very freely eaten by both sheep and cattle, though personally we cannot say that we have seen it eaten to any great extent. Your notes on its medicinal properties, however, are quite new to us. We should say it would be quite safe to experiment with.

2. *Chenopodium carinatum*, a very common weed of cultivation in Queensland. In the more inland parts it occurs in sandy soil, and very frequently in great abundance in dried-up watercourses, on creek banks, &c. It contains two poisonous principles, a prussic acid yielding glucoside and an alkaloid, but in spite of this we cannot say that we have ever heard of its causing any losses to stock in Queensland. We have not heard a common name for it.

Marsh Mallow—Poison Peach.

G.D.D. (Charters Towers)—

The first plant is *Malva pariflora*, the Small-flowered Mallow, more commonly known in Australia as the Marsh Mallow. It is a European plant now widely spread as a naturalised weed in most warm temperate countries. It has been proved by feeding tests to cause "staggers" or "shivers" in stock, particularly travelling stock or working horses, in New South Wales; but no trouble, so far as we know, has been experienced in Queensland, probably, on the whole, because the plant does not occur in such great abundance. Unless forming the bulk of the forage we do not think any trouble is to be feared from it. The other plant is *Trema aspera*, the Peach Leaf Poison Bush or Poison Peach, a native shrub or small tree very common in Queensland and New South Wales. It is generally regarded as a bad poisonous plant. The leaves at times develop a prussic acid yielding glucoside, when, if eaten in quantity, no doubt trouble will ensue. Most losses have occurred with travelling stock. We have repeatedly seen ordinary paddock stock feed very heavily on the plant without any ill effects whatever.

Wax Vine, a Poisonous Plant.

B.B. (Wondai)—

The specimen is *Hoya australis*, sometimes known as the Wax Flower or Wax Vine. It is known to be a poisonous plant, and is, as you assume, the probable cause of your trouble.

Giant "Fat Hen," Wild Cotton.

C.V.J. (Cooyar)—

The Giant Fat Hen is *Chenopodium album*. It is a common European weed now widely spread through most of the temperate regions of the world. It is not known to possess any poisonous or harmful properties.

The other plant, Wild Cotton, is *Gomphocarpus fruticosus*. It belongs to a dangerous family of plants, the *Asclepiadaceæ*, and Dr. Seddon, of the Veterinary Research Institute, Glenfield, New South Wales, advised us in conversation recently that feeding tests carried out with it had proved it definitely poisonous to stock.

Love-in-the-Mist Passion Vine.

J. H. McC. (Hughenden)—

The specimen forwarded with your letter of 29th May and labelled No. 57 is *Passiflora foetida*, sometimes known as Love-in-the-Mist Passion Vine. It is much cultivated in tropical countries as a cover crop and green manure in cocoanut plantations, &c. The vine is quite common in North Queensland and coastal localities, and the ripe fruits are often eaten by children. They have a pleasant flavour, but, as they contain a prussic-acid-yielding glucoside, some danger always attaches to them, though we must say no trouble has been brought under our notice.

Russian Thistle.

Inquirer (Gladstone)—

The specimen represents *Salsola Kali*, a very common plant in Queensland. It occurs both on the coast and inland. It has a wide distribution in one form or other over most of the warm regions of the world, and is commonly

referred to as Russian Thistle. The plant is not known to possess any poisonous properties, though its fodder value is very limited. In its very young stage it is sometimes eaten by stock, and in its older stages the seed-heads are much relished by horses and stock in general, and are nutritious.

The plant is in no way related to the Townsville Lucerne, and it is hard to imagine it having been an impurity in the seed, because it is a tall plant, whereas the Townsville Lucerne is a low or creeping one, the seeds are in no way similar, and it is hard to imagine how the contamination could occur.

Western Rosewood.

R.P.H. (Roma)—

The specimen is *Heterodendron oleæfolium*, commonly known as Western Rosewood. Generally speaking, this tree makes excellent fodder for stock, but there is always some danger in using it, as it develops, like young Sorghum and some other plants, a prussic-acid-yielding glucoside, when, if eaten in quantity on an empty stomach by hungry sheep, death will ensue. We had advice from Mount Abundance recently that a grazier had been feeding his sheep with different trees, including Red Heart or Boonaree, and had had a very serious smash. We had never heard the name "Red Heart" applied to the Heterodendron before, but from the symptoms described—that is, the sheep dying very rapidly after drinking—we strongly suspected this plant.

Stock are very fond of the tree, and if you are hand-feeding we think you will find it quite safe to feed after the leaves have wilted for a short time. Several losses have been recorded in New South Wales, but loss at Mount Abundance is the first definite one that has come under our notice in Queensland, though the plant, we know, has been, and still is, largely cut for fodder.

Valuable Native Herbage.

J.H.McC. (Hughenden)—

The specimen labelled "Horse Weed from Eldorado Station" represents *Psoralea cinerea*. There are a number of species of the genus Psoralea in Queensland and the Northern Territory, and we look upon them as among the most valuable of native herbage. They are legumes, nutritious, and palatable to stock, and are very important members of the native mixed pasture. We think *Psoralea cinerea* and its allies are well worth conserving on any run where they happen to be growing.

"Stagger Weed."

D.K. (Kandanga)—

The weed is *Lamium amplexicaule*, a species of Stagger Weed, sometimes known as Henbit. Feeding experiments with this plant in New South Wales have definitely proved that it can cause "staggers" or "shivers" in working stock or sheep or cattle that are being driven, death ensuing if the affected stock are not taken off the Lamium-infested country. Ordinary resting-paddock stock, such as calves, dairy cows, &c., do not seem to become affected. The excitement of being driven or worked is necessary, apparently, to bring on the symptoms.

Burr Trefoil.

E.C.D. (Townsville)—

The specimen is *Medicago denticulata*, the Burr Trefoil, a native of Southern Europe, now naturalised in most warm temperate countries. It is much more abundant in Southern Queensland and New South Wales than in the North. It is undoubtedly a valuable fodder, providing a large amount of food during the late winter and spring months, dying off at the approach of hot weather. When very green and succulent it is inclined to bloat stock badly. When dying off it leaves a lot of little burr-like pods, which, however, are readily eaten by stock, and, containing seed as they do, are quite nutritious.

Milk-tainting Weeds.

W.R.S. (Rockhampton)—

The taller-growing specimen, *Lepidium ruderale*, is Wild Cress. The more succulent and creeping plant is *Senebiera didyma*, Wart Cress or Bitter Cress. These plants must be looked upon as two of the worst, if not the worst, milk-tainting weeds we have in Queensland. We have had no experience with them tainting the flesh of stock which may feed on them, but should think it likely.

"Brigalow Grass."

E.F.McL. (Torrens Creek, N.Q.)—

The specimens have been determined as follows:—

Eriochloa sp. *Paspalidium cæspitosum.* We were very interested in getting this grass, as we had not had it from your locality before. It is generally known as Brigalow Grass, but some people call it Wallaby Grass. It has recently come into prominence as a fodder, stockowners affirming that it responds well to both winter and summer rains, and that it is palatable and nutritious. Our experience has been that it is more or less confined to brigalow country, but so far as we know no Brigalow occurs anywhere near Torrens Creek.

Amphilophis intermedia, a species of Blue Grass, a tall-growing, coarse grass, nevertheless providing a large amount of valuable forage for cattle.

English Meadow Grass.

F.J.M. (Woodford)—

No. 1 is *Poa annua*, English Meadow Grass, a common European grass now widely spread over most warm temperate countries. In Southern Queensland it often occurs in great abundance during the winter months, dying off on the approach of hot weather. While it lasts it is a very good fodder for stock. Generally speaking, it prefers old cultivation lands around cowyards, &c., or anywhere where the ground has been disturbed. Some farmers, however, have told us that it invades the ordinary pasture, providing a valuable fodder during the late winter and early spring months. No. 2 seems to be the same as No. 1, but seed heads would be necesasry to make certain.

Hexham Scent.

A.C.A. (Cooran)—

The specimen is *Melilotus parviflora*, the Melilot or Hexham Scent. This plant was boomed as a fodder some years ago under the name of King Island Melilot. For sandy soils, and places generally where lucerne and better clovers will not thrive, it has some value, especially for fattening stock. A drawback to it from a dairy point of view is that it taints milk and cream badly. We were interested in your remarks that cattle eat it quite readily, for generally our experience in Queensland has been that stock do not take to it. We do not think the plant is worth while letting go to seed.

Parramatta Grass.

E.W.L. (Landsborough)—

The specimen is *Sporobolus Berteroanus*, most commonly known in Australia as Parramatta Grass. It is a weedy grass of very low value as a fodder. It is a very aggressive grass, however, and in heavily stocked paddocks is inclined to crowd out paspalum, especially on the drier and poorer soils. On this account it should be eradicated where possible.

Prickly Poppy.

Inquirer (Tambo)—

The specimen is *Argemone mexicana*, the Prickly Poppy, a noxious weed, a native of tropical America, now naturalised in most tropical and subtropical countries. It is very common in some parts of Queensland, and is generally regarded as poisonous to stock. It is rarely eaten by them, however, the only cases of trouble that have come under our notice having been where the plants were cut, allowed to wilt, and became soft.

Johnson Grass.

R.H.M. (Kingaroy)—

It is rather difficult to name grasses from roots only, but we think there is no doubt that those you forwarded represent Johnson Grass, *Sorghum halpense.*

This grass provides a certain amount of roughage for stock, but, like other sorghums, contains, especially in its young growth, a prussic acid-yielding glucoside. We have at least one record of pigs being poisoned from eating the white underground runners. The grass is a great pest in a cultivation, and on this account should be eradicated. If the patch is only a small one, careful forking out and stacking, and subsequent burning, would be the best method. Care should be taken not to carry the roots about the field more than possible, for even the smallest piece, if broken off, provided there is an eye to it, will grow.

"Brigalow Grass;" Eriochloa; Gall Weed; Lucas's Rhodes Grass.

C.J.L. (Theodore)—The specimens have been determined as follows:—

1. *Paspalidium distans.*—This is different from Dr. Hirschfeld's grass, which has now been called *Paspalidium cæspitosum*. Both species, apparently, are widely spread in Queensland, though *P. distans* is probably the much commoner of the two. We have had several samples sent to us, and, generally speaking, it is spoken well of as a fodder. Mr. Garvey, of Fernlees, Central Queensland, sent us specimens the other day, saying that this particular species of Brigalow Grass responded magnificently where the brigalow was ringbarked, and provided a wonderful supply of edible fodder. He stated that it was drought-resistant, but required to be grazed short for sheep.
2. *Eriochlœ sp.*—The genus *Eriochlœ* is at present under review, but we have several species in Queensland, and they are generally regarded as palatable and nutritious grasses. We doubt, however, if they are very drought-resistant.
3. *Zygophyllum apiculatum*, the Gall Weed or Twin Leaf.—It has been suspected of poisoning stock, but is practically always avoided by them. An allied species in Central Australia is said to be used in times of drought, however.

In reply to your request regarding Lucas's Curse or Lucas's Rhodes Grass, we are not sure what you mean, but probably you refer to *Chloris virgata*, an annual grass very similar to Rhodes Grass, but with a much heavier and darker seed-head. It is sometimes called Feather Top. It is a luscious-looking grass, but apparently unpalatable and never eaten by stock, unless they are absolutely forced on to it. It is not a pest of cultivation, and should easily enough be got rid of. Perhaps you could let us have a seed-head to make sure of the identification.

Hoya or Wax Flower.

Inquirer (Brisbane)—

Hoya australis, Hoya or Wax Flower, is a climbing plant. The leaves are of a rather succulent nature, smooth, and somewhat shiny. Both leaves and stems, when cut, exude a milky sap. The flowers are white, rather waxy in appearance, and sweetly scented. The plant is poisonous, causing severe gastro-enteritis in stock. In the "Queensland Agricultural Journal" for December, 1915, Mr. A. McGowan, then one of the Government veterinary surgeons, recommended the following remedy:—"1 lb. of Epsom salts and 1 lb. of treacle to be given as soon as the animal is noticed to be sick. This should be followed daily with 2 dr. potassium iodide dissolved in ½ pint of water."

Saccaline for Winter Feed.

J.F.D. (Camp Mountain)—

The Director of Agriculture advises:—Saccaline to be used for winter feed should be sown in January, when it will stand over the early part of the winter, and can be cut when desired. It is advisable to take the precaution of allowing the plant to seed prior to feeding it to valuable stock.

Saccharine or sweet varieties of sorghum invariably grow to a height of from 10 to 15 feet, giving a yield of from 15 to 28 tons per acre, according to the quality of the soil and conditions of climate. The millets and panicums occasionally attain a height of 5 feet, the grain yield being approximately as follows:—Japanese Millet, 8 to 9 tons; Common Panicum or Liberty Millet, 10 tons; and White Panicum, 12 tons per acre.

Sticky Oilskin Coat.

Inquirer (Toowoomba)—

We have had no personal experience of these methods of treating a sticky oilskin coat, but they are said to be reliable:—

(1) If the oilskin is sticky, it would be necessary to boil it in a solution of washing soda and water. After it has dried it should be redressed with oil-dressing.

(2) The application of French chalk in liberal quantities to the sticky portions of the coat is another method that could be employed to remove the stickiness. The chalk must be allowed to remain on the coat for twenty-four hours, when it may be brushed off. Of course, there will be a white mark that will remain for some time, but this method is shorter and more convenient than the boiling method.

A Departmental leaflet on home-made oilskins and tarpaulins has been posted to you direct.

General Notes.

Staff Changes and Appointments.

Messrs. J. C. J. Maunder, B.V.Sc. (chairman), Government Veterinary Surgeon, D. Jackson (Teneriffe), and M. F. Yore (Logan Village), have been appointed members of the Darling Downs South District Stallion Board.

Mr. W. D. Wilson, Ranger under the Animals and Birds Acts, has been appointed Senior Ranger, Animals and Birds Acts, Department of Agriculture and Stock.

Messrs. W. J. Muller, W. R. Perkins (Mooloolah), J. B. Higgins, E. W. Baker (Diamond Valley, Mooloolah), F. C. Henderson (Eudlo), F. J. Dicksen (Petches Creek, Tallebudgera), A. E. Treloar (Myrtletown), R. B. Prior (Meeandah), and E. W. Gager (Eagle Farm) have been appointed Honorary Inspectors under the Diseases in Plants Acts.

Mr. T. H. Cameron, Barboda, Anakie, has been appointed an Honorary Ranger under the Animals and Birds Acts.

Mr. A. Pitts, Overseer of the Shire Council, Mirani, has been appointed an Honorary Ranger under the Native Plants Protection Act.

Constables S. H. Patch (Tara), M. Y. O'Shaughnessy (Eromanga), J. E. T. Pratt (Forsayth), and B. Topp (St. Lawrence) have been appointed also Inspectors under the Slaughtering Act.

Mr. B. Dunbavand, Inspector of Slaughter-houses, Ingham, has been appointed also an Inspector under the Brands Acts.

Members of Stallion Boards have been appointed as hereunder:—

West Moreton District Stallion Board—J. C. J. Maunder, B.V.Sc. (chairman), R. G. Talbot (Ripplebrook, St. Lawrence), W. J. Tomkins (Whetstone, Inglewood); *Darling Downs North District Stallion Board*—A. F. S. Ohman, M.V.Sc. (chairman), A. F. Muller (Fassifern Valley, Kalbar), N. Hastings (Maryborough).

Mr. J. McG. Wills, Agent, Banana Industry Protection Act, Southport, has been appointed also an Inspector under the Diseases in Plants Acts.

Mr. H. W. Eastwood, Senior Fruit Instructor in the New South Wales Department of Agriculture, who is stationed at Murwillumbah, has been appointed also an Honorary Inspector under the Queensland Diseases in Plants Acts.

Mr. H. T. Whitcher has been appointed Cane Tester at the Qunaba Sugar Mill for the present crushing season.

Mr. A. G. Smyrell, Inspector of Stock at Bowen, has been appointed also an Inspector of Dairies.

Constable E. Hanlon, Westwood, has been appointed also an Inspector of Slaughterhouses.

Mr. E. E. Grimson, of Gayndah, has been appointed an Honorary Ranger under the Animals and Birds Acts and the Native Plants Protection Act.

Messrs. J. Cole, G. H. Coombs, E. Abrahams, T. Spowart, G. Parker, O. Schneid (Mudgeeraba District), and W. Brooks, G. Herbst, and H. Groom (Woodford District), have been appointed Honorary Inspectors under the Diseases in Plants Acts for the purpose of the control of banana diseases in their districts.

Newspaper Postage Deficiency.

The Postmaster-General's Department advises that daily and weekly registered newspapers are sometimes under 6 oz. in weight, and at other times over 6 oz., and, as the rate of postage when posted by the public to addresses within Australia is 1d. per 6 oz. or fraction thereof, the result is that many thousands are posted annually bearing only 1d. postage when they should bear 2d. These are surcharged double the deficiency, which is collected from the addressee. The senders are, perhaps, not particularly to blame for this, because they may inquire at the post office the amount of postage required on a certain paper, and, as that particular issue happens to be under 6 oz., they are informed 1d. is necessary, and from this they erroneously conclude that all copies of that particular paper will pass for 1d. and deem any further inquiry as to postage unnecessary.

Approximately 2,000 underpaid newspapers are surcharged monthly at the G.P.O., Brisbane. In some instances the newspapers that vary in weight contain an announcement to the effect that an issue of pages requires 1d. postage, but issues of a greater number of pages require 2d. This, however, appears to fail to meet the situation fully.

In connection with the larger illustrated papers—particularly weekly and monthly publications—large numbers addressed to places beyond the Commonwealth are posted insufficiently stamped, and these are merely destroyed in the Dead Letter Office, as surcharged newspapers are not sent abroad. This results in economic waste, as the senders first purchase the papers with the intention of sending them to friends abroad, and, by not affixing sufficient postage, lose not only the purchase price, but also the value of the stamps actually affixed, the net result being that not only do the senders waste money, but the newspaper concerned possibly loses a new subscriber.

The Postal Department aims to have all postal articles correctly prepaid and so avoid not only economic waste but also hard feelings naturally engendered in the addressees by their being required to pay double the deficient postage. Some newspapers make it a practice to print the postage required to various destinations on each issue in the paper itself or on the wrapper, but even that apparently fails to achieve the desired object.

Peanut Board Election.

An election of a member for District No. 1 of the Peanut Board resulted as follows:—

	Votes.
Charles Frederick Adermann (Kingaroy)	91
Godfried Martinius Pedersen (Wooroolin)	89

Mr. Adermann and Mr. N. A. Nielsen, of Milman, who was returned unopposed for District No. 2, will be appointed for a term of two years as from 28th August.

Atherton Tableland Maize Board.

Regulations have been approved under the Primary Producers' Organisation and Marketing Acts empowering the Atherton Tableland Maize Board to make a levy on all growers of maize in the Petty Sessions Districts of Atherton, Herberton, and Chillagoe at the rate of £1 5s. per ton weight of maize that shall have been harvested during the period commencing 1st June, 1933, and ending 31st December, 1933, to provide for the administrative expenses of the Board and for the current yearly instalment of interest and redemption due and payable to the Crown.

The Queensland Commissioner for Railways and the Commissioner for Main Roads are empowered to collect the levy, and such shall be forwarded monthly to the secretary of the Atherton Tableland Maize Board with a statement showing the sources from which same was collected. Any balance over and above the amount required for the purpose indicated shall be distributed among the growers from whom such levy was collected, at the end of the current season, in proportion to the amounts collected from them.

State Wheat Board Election.

Following is the result of four growers' representatives on the Wheat Board:—

	Votes.
Ernest Ambrose Thomas (Hunterton, via Roma)	1,470
Joseph James Booth (Junabee)	1,448
Thos. Wm. McIntyre (Yarranlea, Pittsworth)	1,366
Wilfred John Brimblecombe (Pirrinuan, via Dalby) ..	1,349
Arthur Carl Krieg (Brookstead)	1,048
Bergittinus Clemen Christian Kirkegaard (Freestone) ..	973
John Edward Nussey (Allora)	937
Aaron Hoskin (Mount View, Jimbour)	797
Edward Fitzgerald (Felton)	354
Wm. Edward McColm (Toolburra)	270

The retiring members were Messrs. E. A. Thomas (chairman), T. W. McIntyre, B. C. C. Kirkegaard, J. E. Nussey, and W. J. Brimblecombe. The new Board will be appointed for a term of one year. The representatives for this year have been elected by the growers from the whole of the wheatgrowing areas, and not from districts as formerly. The number of ballot-papers issued was 3,482, and of that number 2,568 (73.75 per cent.) were returned.

Cheese Board.

An Order in Council has been approved extending the operations of the Cheese Board for the period from 1st August, 1933, to 31st July, 1934.

Banana Board Levy.

An Order in Council has been issued under "*The Banana Industry Protection Act of* 1929" providing for a levy on banana-growers, to be used for the maintenance of the Banana Industry Protection Board. This levy is the same as that imposed last year. The Order provides that, with respect to bananas marketed in the State, the levy shall be collected by means of a deduction to be made by all commission agents, merchants, or persons from proceeds of sales of bananas, the amount to be remitted to the Under Secretary, Department of Agriculture and Stock, not later than the 7th of the following month; also, in regard to bananas marketed outside Queensland, the method of collection shall be by means of the Committee of Direction or the Railway Commissioner adding the sum of 2s. 10d. per ton to the freight charges on bananas, and remitting same to the Under Secretary not later than the 7th of the following month. In the case of bananas (marketed in Queensland or elsewhere) which are not marketed or sent to market by commission agents, merchants, or others, or by or through the Committee of Direction or the Railway Commissioner, the levy shall be remitted by the grower to the Under Secretary not later than the 7th of the following month. This levy remains operative as from 1st August, 1933.

Tobacco-Growers as Primary Producers.

Executive approval has been given to the issue of an Order in Council under "*The Primary Producers' Co-operative Associations Acts,* 1923 *to* 1926," declaring that a person, not being a person engaged in primary production as an employee on wages or piecework rates, engaged in the occupation of tobacco-grower shall be a primary producer for the purposes of the abovementioned Acts. The existing definition of a "primary producer" does not include a "tobacco-grower."

Banana Levy—Southern.

Regulations have been issued under the Fruit Marketing Organisation Acts providing that the existing Banana Levy Regulations shall be repealed insofar as relates to the district between Nerang and the Tweed, and imposing a levy on the growers of bananas in such district.

The new Regulations apply to those growers in the south-eastern portion of the State who are situated in the area bounded on the north by a line as the crow flies from Beaudesert to Nerang, thence by the coast to the New South Wales border, thence by the New South Wales border to where intercepted by the Brisbane-Kyogle railway line, and thence by that railway line to a point nearest to Beaudesert.

The levy is one halfpenny per case containing 1½ bushels or less of bananas, and when sold in the bunch one penny for every £2 or part thereof of the net proceeds upon all bananas grown in the above area. Bananas shall be deemed to be marketed as

and when removed off the land on which they have been grown in the area specified above, and levies are to be paid before the fifteenth day of the month by the grower concerned on bananas marketed the preceding calendar month, but on any such bananas consigned to, by, or through the Committee of Direction of Fruit Marketing, the levy payable will be arranged for collection by the Committee of Direction. For fruit marketed otherwise than through the Committee, then the grower shall on or before the fifteenth day each calendar month furnish a return in writing to the Committee of Direction, Brisbane.

Every company, association, firm, or person carrying or receiving for consigning in the specified district as part of the process of marketing bananas grown in such district shall furnish on or before the fifth day of each calendar month a return in writing to the Committee of Direction of such bananas carried or received by them for consigning during the preceding calendar month, and shall at all reasonable times permit any authorised officer of the Committee of Direction to inspect such books or accounts as may be necessary to ascertain if the regulations are being complied with.

All monies raised by the levy shall be expended only in the interests of the banana section of the Queensland fruitgrowing industry, and any grower in the above district who fails to pay the levy shall be guilty of an offence and liable to a penalty of £20.

Tobacco Export Trade—A Correction.

In General Notes, page 257 of the September Journal, in the course of a statement on the tobacco export trade, the preferential duty on unmanufactured tobacco in the United Kingdom is shown as 7.5½d. per lb., the full duty being 9s. 6d. per lb., in respect to leaf containing 10 per cent. or more of moisture; 8.2½d. and 10s. 6d. respectively for leaf with a moisture content of less than 10 per cent. In the next paragraph it was stated that the preference on Empire tobacco of higher moisture content is 2s. 0¼d. per lb.

On reference to the original copy we find that the figures were not set out clearly. The corrected table is as under:—

RATES OF DUTY IN THE UNITED KINGDOM.

Tobacco Unmanufactured—

	Full Duty. Per lb.		Preferential Duty. Per lb.	
	s.	*d.*	*s.*	*d.*
If unstripped—				
Containing 10 lb. or more of moisture in every 100 lb. weight	9	6	7	5½
Containing less than 10 lb. of moisture in every 100 lb. weight	10	6	8	2¾

Broom Millet Board Election.

The following nominations have been received at the Department of Agriculture and Stock in connection with the election of two growers' representatives on the Broom Millet Board:—Ernest Fred Hutley (Gurgeena, via Gayndah), Hans Niemeyer (Hatton Vale, Laidley), Thomas Martin Rasmussen (The Caves), and Erich Max Schneider (Binjour Plateau, Gayndah). The date of the election has been fixed for the 20th October.

Rural Topics.

Mixed Farming.

Following is a summary of a paper read at a branch conference of the Agricultural Bureau of South Australia by Mr. Frank Masters, an Eyre Peninsula farmer:—

This is recognised as the day of the specialist—the man with one aim, devoting his whole time, energy, and costs to achieve the best and highest that points the way and goes furthest. But all cannot be specialists, either from inclination or ability, or the financial position of one may preclude the necessary expense.

I regard mixed farming as an insurance for successful operation. A lifelong experience in the farming vocation has shown me that never until the present have all prices of produce been down to the lowest together, but usually either wheat,

wool, butter, eggs, pigs, or lambs have been higher in value than the depressed commodity, and has enabled the mixed farmer to pull through, whereas with wheat alone, and many of the other singly, disaster would have been inevitable.

By mixed farming practice the waste of the farm in offal, weeds, &c., can be controlled, eliminated, and turned into profit. Cases in point are the farm flock grazing partially at least on weeds encouraged by cultivation, the dairy herd grazing similarly and supplemented by storage of ensilage from the abundant winter growth, and pigs partially grazing weeds, supplemented by offal otherwise unsaleable.

Without these waste savers, the majority of farms would be unprofitable, even with good prices. No waste can be permitted to-day, and only the mixed farmer can make the best of this opportunity of converting the waste into saleable produce.

With fluctuating values for various products, mixed farming alone offers the agriculturist the opportunity of conversion into more payable products—those products which may be unremunerative when sold directly.

In this case wheat, oats, barley, and hay at low prices may be fed to animals and poultry on the farm and better returns secured. Too often we forget we have an advantage in doing this on the farm, instead of allowing the feeding specialist to do so, in the fact that expense of bags, partial cost of freight, &c., contributes towards the profitable conversion, together with the feeding specialist's profit.

Mixed farming widens the horizon of interests, and one can find in it that variety which becomes the spice of life. Change from the humdrum of one thing brings recreation and relaxation that means invigoration of body, mind, and spirit. The watching, helping, and encouraging of the natural laws of breeding, feeding to secure higher and better growth and production, becomes an absorption once one tastes the fruits of success therein. Always ahead and before the enticing possibility of growing better wheat, better wool, better sheep, better lambs, better pigs, and poultry is the triumph which makes effort worth while.

Factors Essential in Mixed Farming.—These are judgment, management, feeding, and marketing. Judgment really is included in the whole four and makes or mars the whole. It may be termed initial and incidental, and initially is concerned with securing the start or successful inauguration of mixed farming. Finance is usually the governing factor. Judgment demands purchasing the best, but the settler on new country is limited to the funds at his disposal. Aim not at quantity, but quality.

Pedigrees of stock are fully protected by herd societies and stock associations, and proper Governmental authenticated tests can be relied upon by the producer, so that in them he has an excellent guide for selecting initial and subsequent stock, and if he cannot for any reason purchase the best at the outset, he can, through the above records, be sure of buying later stock that will improve those he possesses, according to his judgment and pocket.

The process of improvement of quality will be slower, and for most will be the one followed. Management, however, must be on sound lines.

In wheat, starting with good varieties suited to the district, continual care is necessary regarding cultivation, manuring, harvesting, &c., so that the best sample is produced. Bad management means deterioration of returns and price. The admixture of foreign grains, notably barley, must eventually reduce its value.

Whilst the crossbred animal appears to be the ideal for meat purposes, yet the nondescript crossbreeding resulting in mongrels without type or character must be avoided. The fat jowelled pig must disappear from farms, being displaced by the longer, leaner, and small headed pig, with the Large White predominating in crossing, but the Tamworth-Mid York mother seems the ideal, with the Large White sire. Produce what our customers require and get away from anything of our own fancy. This is true of all production, but notably true regarding the pig.

More judgment is required in managing cows. The weighing and testing of milk is the only certain way of finding out the boarder. Here again the registration of bulls gives an excellent avenue to secure increased quality in the herd. Combination in a locality of a number of farmers would make it easy to secure excellent blood of cattle and horses in the purchase from time to time of good sires. It has been said that half the breed is in the feed, and here a few suggestions are offered. Understock rather than overstock, but adequate stocking is necessary. Research has shown short grass to be the best.

All stock must be kept growing, any setback or stunting means loss of quality and increased cost to restore that quality, which indeed is not always possible. therefore reserves of fodder are necessary.

Once a farm is properly fenced, every effort should be made to carry the most stock possible, consistent with proper results, thus making the return for improvement greater.

Regarding the question of marketing, much remains to be done in the way of organisation. The individual selling of production without due consideration of effect on prices appears to be a question which needs mature consideration. The bulking of consignments of given quality of lines of production may give confidence to customers, and for such lines increased prices should result.

The mixed farm should be conducted from the standpoint of realising the highest returns to the owner. So convinced am I of the necessity of mixed farming that I am inclined to propound the axiom "The farm which is not a mixed farm is no farm at all." In the same way a farm without permanent supplies of water cannot be considered a farm, but both are essentials.

Queensland Butter for "The Kangaroos."

In his notes on the tour of the Australian Rugby League team of footballers now in England, and published in the Brisbane "Telegraph," Mr. Harry Sunderland remarks:—

> "We are eating Empire butter at 11d. a pound. I inspected the store yesterday and found amongst the stock ordered for us a butter box with the brand on it—'Pasteurised Pure Creamery Butter Arcadia. The Downs Co-operative Dairy Association, Limited, Queensland.'"

The Downs is noted for good footballers as well as for good butter, and no doubt much of the vigour and vim and fine physique of Toowoomba's "Galloping Clydesdales" can be traced to the richness of the district pastures and the high vitamin content of its dairy produce.

Care and Handling of Cream.

"Most of the troubles in milk and cream are caused by organisms closely associated with something that is unclean," observed Mr. C. J. Robinson, manager of Bimbaya Butter Factory (New South Wales) in an address at the recent South Coast conference of the New South Wales Agricultural Bureau. In the following passages he referred to some of the common causes of contamination and the measures necessary for its control:—

"Milk in the udder of a healthy cow, under normal conditions, is practically free from bacteria, but directly it is drawn from the cow by ordinary methods of milking it is exposed to the attack of destructive agencies in the form of bacteria. Trouble may start with the cows lying down in the yard waiting their turn to be milked. Milk oozing from teats in contact with the ground becomes infected with bacteria which work up the teat canal and rapidly multiply. Through this cause the first milk drawn from the cow frequently contains large number of objectionable organisms, and dairymen are well advised to discard the first few squirts of milk. Practically nothing is lost in doing so, as it has been definitely proved that this first milk contains practically no butter-fat.

"Again, infection is caused by dust on the cow's flanks and udders dropping into the mik while milking. A very effective way to prevent this is to wipe the flanks and udders with a damp cloth. Cow-bails and yards should always be kept clean. Dirty utensils—buckets, strainers, &c.—should be strictly avoided, and in this connection it should be remembered that no dairy utensil is clean unless it has been scalded with boiling water. This will de-troy any bacteria which might remain. Everyone believes in straining the milk, yet a dirty strainer, whether cloth or gauze, is worse than no strainer at all. Time lost in occasionally shaking out or rinsing the strainer during milking operations is time well spent. This would prevent a large number of objectionable unclean substances being added to the milk. Clean hands and clothing are almost as important as clean utensils. It is particularly important to wash the hands at intervals during milking operations.

"Separators should be thoroughtly washed and scalded after using, night and morning. The modern separator is very easily cleaned, and to get the best results the parts should be placed in boiling water. The boiling water will destroy all germ life remaining after washing, and when taken out of the water the tinware will dry rapidly without the use of a cloth. From the point of view of public health, as well as in the interests of the industry, the dairyman who does not wash his separator after every separating richly deserves all that the law holds in store for him. Unclean milk cans are also a serious source of infection. No man can be certain of producing choicest quality if he does not wash and scald his cans and allow them to cool before using them, even though he may think they are clean when returned from the factory. If this is not done the cream may develop an unclean flavour, and, of course, must be graded down.

"In cases where petrol tins are used as cream containers at the dairy, the seams in the tin should be soldered, otherwise they are a source of contamination which will surely soon be seen in the cream quality. After being in use for some time unsoldered seams become a 'safe deposit' for a yellowish slime, which is practically a bacterial culture, and which will adversely affect cream quality.

"Cream and separator rooms should be kept clean at all times. The floor should be scrubbed with a broom. If well drained they will dry in a short time, and the room is left sweet and clean. If properly used under clean conditions nothing will give better results than a milk or cream cooler. Besides lowering the temperature of the cream, and thus checking bacterial development, coolers aerate the cream, release gases and food flavours, and improve the body and consistency. If coolers were generally used there is no doubt that marked improvement in the quality of cream delivered to the butter factory would result. It is advisable always to mix the freshly separated cream (after it is cooled) with the cream already held in the dairy. Lots should not be held separately until delivery day. The mixed cream should be stirred with a metal stirrer at intervals in order to keep the mass uniform.

"Dairymen can rest assured that graders at dairy produce factories know the difference between good and bad quality. If cream is classified out of choice grade it has definitely an 'off' flavour or taint of some description. No manager or grader desires to receive cream of inferior quality at the factory. The cause of the inferiority is to be found somewhere between the cow and the factory, and can usually be overcome by cleanliness and attention to detail, not by assuming that all conditions under which the cream is produced are ideal and that the factory manager or grader is wrong."

Prevention of Disease in Stock.

In the prevention of disease or the spread of disease in stock much may be accomplished by management in accordance with the knowledge which science has disclosed. Emphasising this fact in the course of a recent address to farmers, the District Veterinary Officer (South) of the New South Wales Department of Agriculture specified some ways in which losses might be avoided or appreciably reduced.

Precautions During Shearing.—We know, for example, it was pointed out, of a number of serious diseases which may occur if shearing operations are not carried out with due regard to proper sanitary precautions. Old skins are strewn over the board between shearings, and these may leave germs which find refuge in cracks in the boards, which are packed with the accumulated dirt of years, while the counting out pens are inches deep in manure, dead wool, and portions of horns and hooves. The open and bleeding wounds of sheep mutilated at shearing are brought in contact with this germ laden filth, and if harmful germs happen to be represented in the debris, then a percentage of sheep will be lost from tetanus or gas gangrene (blood poisoning), to say nothing of the very high percentage of sheep which will contract "cheesy gland" (caseous lymphadenitis) in this way. Dirty knives and yards may cause a like loss in lambs, subsequent to marking. All of these losses may be prevented absolutely by careful attention to cleanliness round the shearing shed and marking yards.

Control of Liver Fluke.—The liver fluke of sheep and cattle is a parasite which can only continue to propagate by passing part of its life in the sheep's liver and part in the fresh water snail. If the snails be killed out by treating the watercourses with bluestone then the fluke must die out. Black disease of sheep depends upon the liver fluke, so that the treatment just referred to is a method of dealing with these two serious conditions at the same time.

The hydatid that is so commonly seen in the livers and lungs of sheep and cattle is the same one that affects the human being. Like the liver fluke, it must also pass through another animal to complete its life cycle, but in the case of the hydatid, the dog is the other animal necessary, and yet it appears to be a little known fact that the occurrence of hydatids in the human being, and in sheep and cattle, can be absolutely prevented by the simple procedure of refraining from throwing the raw offal from sheep and cattle to the circle of dogs usually seen waiting for it.

Losses from Fowl Tick.—A good example of disease prevention is the method of controlling "tick fever" of poultry. This disease is caused by a blood parasite which is transmitted to the birds by the bite of the fowl tick. The tick is concealed in cracks, &c., in the timber or the bark of trees, especially pepper trees, and comes out at night to feed on the birds on their perches, and in this way a few ticks can kill half the fowls in the yard. All this loss can be prevented definitely

by adopting the recognised methods of having the fowl perches, &c., tick-proof. The control and eradication of the cattle tick and also "redwater," the disease which it transmits, can be effected by dipping the cattle in accordance with the life-history of the parasite. The dipping of sheep for the "tick" or ked and for lice is a practice which demands attention throughout the State in order to prevent the spread of these parasites, and thus save the wool from unnecessary deterioration and the sheep from loss of condition.

Danger from Poisonous Plants.—The subject of harmful and poisonous plants is in itself a very large one, and the stockowner or drover can hardly afford to be without some knowledge of plants which are poisonous or which assume poisonous properties under certain sets of conditions. Thus from time to time we hear of heavy losses in sheep or cattle as a result of eating such plants as the variegated or cabbage thistle, blue couch grass, the milk weed (*Euphorbia drummondii*), sorghum and sudan grass types, and the loppings of sugar gum trees. All of the foregoing plants may be poisonous under certain seasonal conditions, and provided the stock which eat them are unaccustomed to them and consume a considerable quantity when hungry. These are but a few of a large list of plants which may be the cause of mortality from time to time.

The destruction of carcases in the paddocks is an item of importance in disease control. The most desirable method is by burning, but when fire risks prevents this, burial might be adopted, and if the ground is too hard for this a lot of good will be done if the carcase is freely opened, the limbs detached, and the internal organs cut and spread about. The heat of the sun will then dry up the flesh and animals and birds will soon dispose of the offal. This method is hardly desirable in the case of germ diseases, but it is an effective way of depriving blowflies of breeding grounds. An outstanding exception to this latter method of disposal is the animal suspected of dying of anthrax. On no account should such a carcase be opened.

Risks of Indiscriminate Purchasing.—Many diseases are capable of being introduced into the dairy herd as a result of continual and indiscriminate purchasing. Cattle may carry the microbes of serious diseases in their bodies without betraying the fact in any way. Among such diseases are tuberculosis, pleuro-pneumonia ("pleura"), contagious abortion, and mammitis, and the risk of introducing these diseases is greatly increased to the farmer who continues to buy and sell rather than build up his own herd by breeding. In the same way sheep owners may purchase animals which are lightly infested with lice or tick, and which in the course of a very few months become heavily infested.

Farm Leaders of To-morrow.

Thus the current "Producers' Review" (Toowoomba):—"Where are we to get new leaders of agriculture? Most, if not all, of our agricultural leaders of to-day have served for a generation or longer; many of them have reached the allotted span of life; many have become mentally dull and physically tired. Yet there are no leaders—no younger men—to take their place."

Thus writes a correspondent in a pertinent reference to farm leadership. There is much truth in his statements, more especially in reference to leadership of some sections of agriculture in Queensland. In the sugar industry there are many young men who are developing as leaders, but even in that section of agriculture there is a need for younger men generally to play their part in taking responsibilities which are becoming more pressing every day.

There are many reasons why the younger men of agriculture should play their part in dealing with the problems which face all sections of primary production.

How can those young men gain the knowledge to fit them to assume leadership? By definitely determining that they will study some section of their industry until they have the knowledge which will fit them to act as leaders. We are all amenable to development. Granted a sound body, with normal sense organs, anyone can develop in any direction he chooses in accordance with his general intelligence and his power to persist in the undertaking which he places before himself as an objective. The men who achieve important positions in life depend less upon their natural special aptitudes or inherited gifts than on acquired ability to fix their attention upon any specific problem. Charles Dickens once said: "The one serviceable, safe, certain, remunerative, attainable quality in every study and pursuit is that of attention. My own knowledge, such as it is, would never have come to me but for the habit of commonplace, humble, patient, daily, toiling, drudging attention."

The Home and the Garden.

OUR BABIES.

Under this heading we issue a monthly series of short articles dealing with the welfare and care of babies, in the hope of increasing their health and happiness, and decreasing the number of unnecessary deaths among them.

IN PRAISE OF THE GOAT.

For the Men and Women of the West.

The sheep makes the squatter wealthy (but often it breaks him). The goat keeps the children of the West healthy. For goat's milk is just as good as cow's milk; indeed, analysis shows very little difference between them. It is a common mistake that goat's milk is stronger than cow's milk. Perhaps during dry spells the cow's milk sold in the Western townships may be rather thin. This occurs also sometimes in Brisbane. If the goat has eaten certain weeds, the milk may have an unpleasant taint. The same happens with the cow. The woman who milks her own goat has three great advantages. She knows that the milk is clean, that it is fresh, and that it contains no added water. It is a foolish mother who says she cannot drink goat's milk. Her children, hearing her, develop the same dislike. This is just a disease of the imagination. We have drunk both cow's and goat's milk, and could not detect any difference between them. From goat's milk you can make the most delicious junket. Mix it with small pieces of fresh oranges, or uncooked ripe tomatoes, and see how your children take it. Kings' sons could have no better food. From goat's milk you can make fresh butter. Though white, it is just as good as yellow butter.

The Goat Deserves a Statue.

The goat is far more intelligent than the sheep, and much cleaner in habit than the cow. He will forage for himself in seasons when both these would starve and die. Certainly he may be troublesome. Unless they are well fenced, he will rob your gardens. In this he resembles the human boy. What could be more beautiful than the kids? No mother calls her children calves, and few call them lambs, but "kids" is a term of endearment constantly used. To those who know beauty when they see it, the full-grown goat is also a handsome animal. We should like to see his statue on a pedestal in every Western township. He deserves it, for is he not the saviour of your children?

Do Your Best for the Children.

Why then is he made the butt of so many senseless jokes? You know he cannot live on glass bottles and kerosene tins, though he will bravely tackle anything eatable when food is scarce. Why do you not try to have goat's milk all the year round? A good nanny deprived of her kid, well fed and milked twice a day, will give you milk for nine or twelve months. Because she gives you milk for nothing half the year, you grudge her a little food during the other half. In places like Charleville and Cunnamulla, where gardens can be grown with bore water or river water, surely you can grow some sort of green feed for her! You might even spend a little on lucerne chaff, bran, or maize. In some places, by taking a little trouble, you could feed a few milking goats on mulga during the dry spells. Each place has its own difficulties and problems, and the man on the spot must tackle them. During the long hot spells, when the goats are dry, and the fowls lay no eggs, your children are poorly nourished, and fall easy victims to all infections, including bung-eye and sandy blight, which destroys their eyesight. Do your best for the children.

A Benevolent Board.

There must be some restrictions on the number of goats. The Charleville District Improvement Board allow ten goats to each family. For each goat there is a registration fee of one shilling, and fivepence for a collar. In necessitous cases the Board remits the fees. At the annual round-up of goats, which does not

take place every year, all unregistered goats are put in the pound. Any necessitous person is allowed to take possession of the goats he needs without charge, before the remainder are destroyed. Gentlemen of the Charleville Board, your regulations are more than just; they are benevolent. On behalf of the children, we thank you.

WHEN MUTTON IS ON THE DAILY MENU.

The following paper was read by Mrs. A. F. Cummings at a recent conference of the Upper North Branches of the Agricultural Bureau of South Australia, and published in the "Journal of the Department of Agriculture of South Australia":—

ON most farms sheep provide the main meat supply, and unless one can vary the cooking the family will get very tired of mutton every day. Some housewives serve the mutton generally as a roast with chops sometimes as a change. Then it is no wonder one hears the remark, "I am sick of mutton." There are quite a variety of ways of cooking this meat which can be made into a tasty meal besides making the most of the meat supply, a consideration in these times. Even when the farmer is his own butcher the sheep means money. The following are some of the ideas I adopt to use up the whole of the sheep, whilst giving the family quite a variety of meat dishes:—

The leg, shoulder, and loin are usually roasted in the oven, or braised in a boiler on the stove. If the mutton is roasted the potatoes are usually baked under the joint. The bone in a leg or shoulder may be removed and the cavity filled with seasoning. This is very nice eaten cold, and makes a nice Sunday dinner, when the "cook" should have a day's rest if possible. The leg or shoulder may be boiled with carrots or parsnips and served with either parsley or onion sauce.

The meat from neck and breast may be put through the mincer, add a little soaked bread, salt, pepper, and thyme, and sausage meat will be provided for breakfast or rolls. For a small family mince one-half for sausage meat, and the rest will make a savoury stew, curry, meat or sea pie. The bones should not be thrown away but boiled to form stock for soup. The breast of mutton may be spread with seasoning, rolled and tied, then boiled or baked; it is best eaten cold. The meat from the neck makes nice Cornish pasties or small meat pies, as it is mostly lean.

The breast of mutton and knuckle end of leg or shoulder with the two kidneys will make a very nice meat pudding or pie. Allow the pudding plenty of time to cook so that the meat will be tender. The knuckle ends of a shoulder and leg and the meat from the head and the tongue will make potted meat, which is very suitable for hot days.

The sheep's head is often thrown away, but properly prepared it makes one or more nourishing meals. The head must be chopped or sawn in two; remove the eyes, tongue, and brains, then soak in salt and water for some hours. The head should be put into cold water and boiled or simmered until the meat will leave the bones. There are several ways of serving:—To make soup—Remove the head, strain, and allow to cool so that any fat may be removed, return to saucepan, add soup vegetables, and thicken with either pearl barley, macaroni, rice, or sago, serve very hot with croutons of toasted bread. The meat from the head may be cut into small pieces (also tongue and brains) and added to the soup which has been thickened with rice or pearl barley. This is sheep's head broth, and the vegetables, carrot, turnip, and onion, may be put on to cook with the head, and the whole simmered for about three hours. Add a little parsley before serving.

Sheep's head fricasseed may be made by cutting the meat, brains, and tongue into small pieces and adding it to white sauce; cook for a few minutes, add parsley, and serve very hot. The tongue may also be salted and boiled, and the brains fried and served on toast. Fricasseed brains make a nourishing meal for an invalid.

The liver and heart should also be used. There are several ways of cooking liver; usually it is fried with rashers of bacon for breakfast. This is a favourite dish. Cut the liver into slices and place in a baking dish or casserole with rashers of bacon, then a thick layer of sliced onions, add pepper, salt, and a good dusting of flour, and nearly cover with water. Place in a hot oven and cook until tender. If a casserole is used, it may be left in the oven for the whole of the afternoon, and the long slow cooking is an improvement.

Another way is to mince the liver, bacon, and onion, put into pie dish, adding a little salt, sage, and pepper. Sprinkle the top with breadcrumbs and dot with butter. Cook in a moderate oven for one hour. This is often called mock goose.

The heart should be stuffed with seasoning and roasted, and the kidneys roasted or cut in halves and fried.

Try some different ways of cooking chops; for instance, haricot chops are a change. For this take neck chops (as these are not so fat), chop in half and fry brown on both sides. Place in a saucepan. Peel and chop one onion, carrot, and turnip (grate the carrot and turnip if liked) and fry until brown. Add pepper and salt and enough flour to thicken, then about 1 pint of water. Stir well and pour over the chops. Allow it to stew for 1½ hours. Curried chops are also nice; these are cooked the same as the former recipe, only using an apple instead of carrot and turnip and adding curry powder with flour, pepper, salt, and sultanas. Serve with boiled rice. Chops are also nice cooked in the oven, and when partly done, pour over them a nice batter.

There are various ways of using up cold mutton left from a previous meal, which are tasty and economical. For this purpose a mincer is a boon to any housekeeper, and should be in every farm home. A very little cold mutton minced with some onion and mixed with breadcrumbs (or soaked stale bread), an egg to bind, will form rissoles for tea or breakfast, or the mince may be heated and served up on toast. The remains of a cold leg of mutton makes nice curry, which will be appreciated in cold weather.

A hash is another method of using up the remains of a leg of mutton. A casserole is nice for this, as the slow cooking in the oven does not make the meat tough. A hash or stew should never be boiled, only simmered.

Potato or shepherd's pie is always a favourite and is easily made from the leftovers of mutton. Mince some cold muton, mix with it some chopped parsley and onion, pepper, salt, and a little flour and stock to moisten. Put into a pie dish and cover with a thick layer of mashed potatoes. Brush over with beaten egg or milk and cook in the oven until it is thoroughly heated a nice brown, garnish with parsley.

This is another way for using cold meat:— 1 cup of minced meat, 1 cup of bread and milk (fairly thin and previously boiled), 1 beaten egg, pepper and salt, 1 teaspoon curry powder and a little chopped onion. Mix together in a pie dish. Sprinkle dry breadcrumbs on top and dot with butter. Bake from 30 to 35 minutes. Rice, breadcrumbs, potatoes, or batter may all be combined with cold mutton, making a very little into a savoury and satisfying meal. The following are some recipes well worth trying:—

German Patties.—Cut thin slices of bread, and stamp out with a round cutter. Dip the rounds in melted butter. Make a mince of cold mutton, a tablespoon of grated cheese, a little curry powder, pepper and salt, and some good gravy. Thicken with a little flour. Put as much of the mixture as possible between two rounds of bread, press together, and dip in egg and breadcrumbs. Fry and serve very hot.

Mince Collops.—1½ lb. mincemeat, 1 onion, 1 tablespoon of flour, salt, and pepper, 1 pint water, 1 tablespoon fat. Divide the mince into small pieces and make into round balls, rolling in mixed flour, pepper, and salt. Heat the fat in the saucepan and fry the balls until brown all over. When the meat is fried drain most of the fat out of the saucepan, then fry the chopped onion, and add 1 dessertspoon of flour. Stir until brown, then add water; when boiling add meat balls and simmer one hour.

Meat Macaroni, and Tomatoes.—Cold meat, minced or chopped, 3 oz. macaroi, 3 large tomatoes, salt, pepper, sugar, and 1 gill of stock. Boil macaroni for 20 minutes in salted water. Strain and place a layer of it in a greased pie dish. Cover with half the meat, seasoned with pepper and salt, then a layer of sliced tomatoes sprinkled with sugar. Repeat these three layers, cover the top with breadcrumbs, and pour down the side 1 gill of stock. Bake in a moderate oven until the crumbs brown.

In summer it is advisable to put part of the sheep into pickle, as the mutton will not keep fresh in hot weather. Corned mutton is very nice boiled and served hot with carrots or cauliflower and white sauce or as a cold luncheon with lettuce salad.

The caulfat, suet, and any other scraps of fat or dripping should be rendered and put aside for soap or candles. Soap is quite simple to make at home. I generally use 12 lb. of fat at once, boiling it in the copper after the washing is done, but 6 lb. of fat can be made in a kerosene tin.

The skin of the sheep may also be used at home. Tanned or "cured" it will make a very nice mat, and odd pieces can be used to make polishers for floors, furniture, or boots. The wool, washed or "scoured," is used to make wool mattresses or wool-a-downs; it is also nice for stuffing cushions or toys for the little ones. In this way very little of this valuable animal is wasted, most of it being used up on the farm, with a small amount of labour and very little expense.

Orchard Notes for November.

THE COASTAL DISTRICTS.

NOVEMBER is somewhat of a slack month for fruit in the coastal districts, as the citrus crop, excepting a few Valencia Late oranges, off-season lemons, and a few lines, is over. Pineapples are also scarce, as the late spring crop is finished, and there are only comparatively few off-season fruits ripening. The main summer crop of fruit in the principal producing districts is only in the flowering stage, though that in the more tropical parts is ready for marketing. It is also a slack month for bananas, as the summer fruit is not yet fully developed, and the bunches that make their appearance are usually poor. They have been slow in developing on account of the comparatively cool weather of winter and early spring, when the suckers were more or less at a standstill. Young suckers should, however, be making vigorous growth now, and the plantation will require constant attention to prevent the stools being overcrowded with too many suckers. Keep the land well worked and free from weeds of all kinds, as good growth now means good bunches in the autumn and early winter. Where there is a danger of the soil washing badly with heavy rain, rows of Mauritius, velvet, or other suitable beans should be planted at right angles to the fall of the land, as the growth they make will tend to hold the soil, and thus save any from being washed away. When planting beans of any kind, either to prevent washing or for green manuring, don't forget to manure them, as thereby you will get a much greater yield, and as none of the manure is removed from the soil, as the crop is allowed to lie and rot on the ground, it is all made use of eventually by the permanent crop.

A good all-round manure for a bean crop is a mixture of 1 cwt. of sulphate of potash and 4 cwt. of basic superphosphate or finely ground phosphatic rock to the acre, and if the soil is deficient in lime a dressing of not less than half a ton to the acre will be found very beneficial, as all leguminous plants require lime to yield their maximum return both of haulm and pulse. The pineapple plantations require to be kept in a state of thorough tilth, and no weeds must on any account be allowed to grow. If blady grass makes its appearance it must be stamped out, as once it gets established in the rows it is only a short time before it takes control, and the plantation is ruined, so that it can only be brought back into profit by taking out the pines, killing the blady grass, and, after thoroughly and deeply working the land, manuring it and replanting.

The planting of pineapples and bananas can be continued throughout the month, taking care to see that the land is properly prepared and that the advice given in previous monthly notes is followed. Young papaw plants that have been raised in the seed bed can be set out now, as also can young passion fruit. Citrus orchards require to be well looked after; the ground must be kept in a state of thorough tilth, and if the trees show the slightest sign of distress, owing to lack of moisture in the soil, they must be given a thorough irrigation if water is available for this purpose. The trees should be carefully examined from time to time, so as to note when young scale insects of any kind are hatching out, and when this is noted they should be sprayed with a weak emulsion of a miscible oil consisting of one part of oil in forty parts of emulsion, as this is quite strong enough to kill any young scales before they develop their protective covering. As stated in these notes previously, no oil sprays should be used when the trees are suffering from lack of moisture, as they are then likely to do more damage than good to citrus trees. If scale insects are very bad, and it is important that the trees are sprayed, a weak lime-sulphur spray, or even a soap and tobacco or weak resin wash, will kill the young scales as they hatch out. In the earlier districts a keen lookout must be kept for the first appearance of the mites, which are the direct cause of the darkening of the skin of the fruit known as "Maori." The first indication of the trouble is that when the sun is shining on the young fruit it appears to be covered with a grey dust, and if the fruit is examined with a good lens, it will be seen to be covered with large numbers of small yellowish slug-like insects which are living on the skin. Spraying with sodium or potassium sulphide washes, as recommended by the Department, or with a weak solution of lime-sulphur, will destroy these insects and prevent the fruit from turning black. Borers of all kinds should be looked for and destroyed wherever found. Water sprouts, if not already removed, should be cut away. Vines will require careful attention, and the vineyard should be kept in a state of thorough cultivation. Spraying for downy mildew and black spot should be continued, if necessary, as well as sulphuring to prevent oidium.

Fruit fly must be systematically fought whenever seen, and special care must be taken to gather and destroy any early ripening peaches or other fruit that may be infested. If this is done systematically by all growers, as provided by the Diseases in Plants Acts, there will be many less flies to attack the later crops of mangoes and other fruits.

Leaf-eating insects of all kinds should be systematically fought wherever seen, by spraying with arsenate of lead, and potatoes and tomatoes should be sprayed with a combined spray consisting of Bordeaux or Burgundy mixture and arsenate of lead, so that diseases such as early blight and Irish blight may be prevented and leaf-eating insects, which frequently cause very heavy losses to these crops, be destroyed.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

KEEP the orchards and vineyards in a thorough state of cultivation, so as to keep down all weed growth and conserve moisture in the soil. This is important, as if a long spell of dry weather sets in, the crop of summer fruit will suffer severely from the lack of moisture. Citrus trees should be irrigated where necessary, and the land kept in a state of perfect tilth. Spraying for codlin moth should be continued, and all pip fruit trees must be bandaged at the beginning of the month; further, the bandages must be examined at frequent intervals and all larvæ contained in them destroyed. The neglect to spray thoroughly and to attend to the bandages properly is responsible for the increase in this serious pest in the Granite Belt, and growers are warned that they must pay more attention to the destruction of this pest if they wish to grow pip fruit profitably. Fruit fly may make its appearance in the cherry crop; if so, every effort should be made to stamp out the infestation at once, as, unless this is done, and if the fly is allowed to breed unchecked, the later ripening crops of plums, peaches, apples, pears, apricots, and Japanese plums are bound to become more or less badly infested. Combined action must be taken to combat this, the most serious pest of the Granite Belt, and growers must realise that, unless they take this action and see that careless growers do not breed the fly wholesale, they will never keep it in check, and it will always be a very heavy tax on their industry. Rutherglen bug is another serious pest in this district, and is propagated by the million by careless orchardists. The best remedy for this pest is to keep the orchard clean and free from weeds. Brown rot in fruit should be watched for carefully, and, on its first appearance in a district, all ripening fruit should be sprayed with the sodium sulphide wash.

All kinds of leaf-eating insects should be kept in check by spraying with arsenate of lead, and all grape vines, potatoes, and tomatoes should be kept sprayed with Bordeaux or Burgundy mixture, the former for black spot and downy mildew, and the latter for early and late (Irish) blight.

Farm Notes for November.

Field.—Farmers are commencing to realise that quick-maturing wheats which possess a degree of rust resistance are more dependable than the slow-growing and often rust-susceptible kinds, which are gradually giving place to these and mid-season varieties.

Growers are advised to make every preparation to work up the surface of the ground immediately after the removal of their crops, so that the soil may be put into good condition to receive any rain which falls, the conservation of which is the best guarantee for the success of the next succeeding crop. Such initial preparation also encourages the early growth of all foreign and weed seeds, and permits of their eradication by the implements used to produce the desired soil mulch. In such manner paddocks are kept clean and the purity of crops is maintained. The careful preparation of areas intended for maize-planting cannot be too strongly impressed upon growers. Deep and thorough ploughing, followed by cross-ploughing and subsequent cultivation of the soil, must precede sowing if success would be attained; and all efforts must be concentrated to obtain a good surface mulch. Failure to follow up the subsequent sowings by harrowing prior to the appearance of the young plant conduces to weed growths and very often entails, by neglect of this operation, subsequent hand-hoeing between the plants in the drills. Harrowing should be discontinued before the plant breaks through the surface, otherwise damage will accrue to the tender shoots of the young plants. When the young maize plant

has hardened up it may, with advantage, be lightly harrowed in the direction of the drills, but such practice must discontinue once the plant has attained a height of 6 inches. Close cultivation by inter-row cultivation implements is necessary after every shower to conserve moisture and to prevent weed growth, care being taken to ensure each cultivation being shallower than the preceding one, and so prevent damage to the root system of the plant, which is extensive. Inter-row cultivation should cease with the advent of the cob on the plant; and, if proper attention has been given to the crop, it should, at this period, be unnecessary. Where crops are planted on the check-row principle, inter-row cultivation is facilitated, and more even crops result.

The French millets (red and white), owing to their rapid maturing qualities, form excellent intermediate or supplementary crops, and are suitable for present sowing. Their value for fodder and seed purposes is worthy of more general recognition at the hands of the average farmer.

Past dry periods have impressed upon us the necessity of providing during good seasons against the return of less favourable ones, and in this connection the cultivation of quick-growing fodder plants appeals to us. Many varieties of useful classes of fodder can be cultivated over a large portion of this State; chief of which, perhaps, are the sorghum family for grain and fodder purposes. Of the latter, Sudan grass has much to commend it, and is fast becoming one of the most favoured by stockowners. Grain sorghums, of which Feterita, Red Kaffir, and the various Milos are examples, should occupy a more prominent position for purposes of horse and pig feeding, and are particularly suited to those localities which are unsuitable for maize production. Some varieties of sorghums have strong frost-resisting qualities, and lend themselves to those localities where provision for some form of succulent fodder is necessary during the winter months.

TUBERCULOSIS IN PIGS—MEASURES FOR CONTROL.

There is no practical method of treatment of tuberculosis in animals, but by attention to the following precautions the disease may be kept under control in the piggery.

1. As cattle are the main source of infection, the tuberculin test should be applied to the herd and all reactors removed.

2. Do not allow pigs to roam about pastures and yards used by cattle unless it is definitely known that there is no tuberculosis in the herd.

3. All skim-milk and other dairy products should be heated to 180 degrees Fahr. and kept at that temperature for fifteen minutes before being fed to pigs.

4. All refuse, slaughter-house offal, and similar food should be boiled before it is given to pigs.

5. In view of the possibility of pigs gaining infection from poultry affected with tuberculosis, pigs should not have access to runs used for poultry.

6. Where tuberculosis is found to be present in the herd, all suspected animals should be slaughtered, and where this is done under qualified supervision the carcases which have only a slight infection of the head glands will be passed for human consumption. the affected parts only being condemned. The pens should be thoroughly disinfected and lime-washed, disinfectant being added to the lime. All litter and rubbish in the yards should be burned and the ground loosened and treated with quick-lime.

7. In the case of stud pigs, if tuberculosis is suspected of affecting any of the animals, arrangements should be made to test the whole of the pigs. The reactors could then be removed.

Fresh air and sunlight are great enemies of the tubercle bacillus. Hence pens and sties should be open and airy, and have no damp dark corners to which the air and sun cannot penetrate.—A. and P. Notes, N.S.W. Dept. of Agric.

CLIMATOLOGICAL TABLE—AUGUST, 1933.

Compiled from Telegraphic Reports.

Districts and Stations.	Atmospheric Pressure. Mean at 9 a.m.	Shade Temperature. Means. Max.	Means. Min.	Extremes. Max.	Date.	Min.	Date.	Rainfall. Total.	Wet Days.
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cooktown	30·05	78	68	83	22	57	2	102	5
Herberton	..	69	55	82	21	37	3	122	10
Rockhampton	30·19	72	54	79	9	42	2	88	9
Brisbane	30·24	69	48	76	9	41	25	90	5
Darling Downs.									
Dalby	30·24	66	41	75	30	27	4	131	6
Stanthorpe	..	58	32	70	30	19	4	105	6
Toowoomba	..	62	41	74	19	31	15, 25	152	9
Mid-interior.									
Georgetown	30·03	84	66	91	31	39	1, 2	74	3
Longreach	30·16	72	48	85	31	38	1	25	2
Mitchell	30·22	65	41	77	30, 31	29	5	82	5
Western.									
Burketown	30·06	83	59	90	19, 30	48	2, 3	..	..
Boulia	30·14	75	49	95	28	38	5	78	3
Thargomindah	30·20	67	45	81	28, 30	35	2	105	5

RAINFALL IN THE AGRICULTURAL DISTRICTS.

Table showing the Average Rainfall for the Month of August, in the Agricultural Districts, together with Total Rainfall during August, 1933, and 1932, for Comparison.

Divisions and Stations.	Average Rainfall. Aug.	No. of Years' Records.	Total Rainfall. Aug., 1933.	Aug., 1932.
North Coast.	In.		In.	In.
Atherton	0·83	32	2·71	2·08
Cairns	1·73	51	2·77	3·55
Cardwell	1·24	61	1·83	1·01
Cooktown	1·24	57	1·02	0·72
Herberton	0·64	47	1·22	1·32
Ingham	1·42	41	1·87	1·41
Innisfail	4·91	52	6·18	4·10
Mossman Mill	1·27	20	4·30	2·54
Townsville	0·50	62	1·84	0
Central Coast.				
Ayr	0·56	46	1·88	0
Bowen	0·64	62	2·18	0·17
Charters Towers	0·54	51	0·37	0
Mackay	1·03	62	1·93	0·48
Proserpine	1·27	30	3·87	0·80
St. Lawrence	0·82	62	0·58	0
South Coast.				
Biggenden	1·05	34	2·41	0·22
Bundaberg	1·28	50	1·58	0·23
Brisbane	2·00	82	0·90	0·38
Caboolture	1·53	46	1·20	0·27
Childers	1·20	38	1·69	0·19
Crohamhurst	2·20	40	1·40	0·97
Esk	1·49	46	0·96	0
Gayndah	1·15	62	1·46	0
Gympie	1·73	63	1·25	1·24
Kilkivan	1·45	54	1·45	0·40
Maryborough	1·69	61	1·80	0·67
Nambour	1·84	37	1·37	0·90
Nanango	1·31	51	1·58	0·08
Rockhampton	0·84	62	0·88	0·11
Woodford	1·70	46	1·40	0·19

Divisions and Stations.	Average Rainfall. Aug.	No. of Years' Records.	Total Rainfall. Aug., 1933.	Aug., 1932.
Central Highlands.	In.		In.	In.
Clermont	0·69	62	0·66	0
Gindie	0·65	34	*	0
Springsure	1·05	64	1·59	0
Darling Downs.				
Dalby	1·20	63	1·31	0·40
Emu Vale	1·11	37	0·60	0·12
Hermitage	1·22	27	0·38	0·08
Jimbour	1·16	45	1·24	0·17
Miles	1·12	48	1·52	0·11
Stanthorpe	1·78	60	1·15	0·50
Toowoomba	1·65	61	1·50	0·78
Warwick	1·47	68	0·61	0·15
Maranoa.				
Roma	0·92	59	1·21	0·05
State Farms, &c.				
Bungeworgorai	0·75	19	0·98	0·05
Gatton College	1·14	34	0·73	0·60
Kairi	0·86	19	*	1·34
Mackay Sugar Experiment Station	0·88	36	1·66	0·35

* Not received.

GEORGE G. BOND, Divisional Meteorologist.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	October. 1933.		November. 1933.		Oct. 1933.	Nov. 1933.
	Rises.	Sets.	Rises.	Sets.	MOONRISE. Rises.	Rises.
					p.m.	p.m.
1	5·33	5·51	5·3	6·9	3·30	5·14
2	5·32	5·52	5·2	6·10	4 29	6·12
3	5·31	5·52	5·1	6 10	5·28	7·9
4	5·30	5·53	5·0	6·11	6·26	8·6
5	5·28	5·53	5 0	6·12	7·24	9 0
6	5·27	5·54	4·59	6·13	8·23	9 51
7	5·26	5·54	4·58	6·14	9·20	10·40
8	5·25	5·55	4·57	6·15	10·15	11·24
9	5·24	5·55	4·57	6·15	11·9	a.m.
10	5·23	5·56	4·56	6·16	12·0	12·1
					a.m.	
11	5·22	5·56	4·56	6·17	..	12·32
12	5·21	5·57	4·55	6·18	12·45	1 5
13	5 20	5·57	4·55	6·19	1·29	1 36
14	5·19	5·58	4·54	6·20	2·5	2·7
15	5·18	5·58	4·54	6·21	2·39	2 39
16	5·17	5·59	4·53	6·21	3·9	3 15
17	5·16	5·59	4·53	6·22	3·40	3·54
18	5·15	6·0	4·53	6·23	4·12	4 43
19	5·14	6·1	4·53	6·24	4 45	5·42
20	5·13	6·1	4·53	6·25	5·23	6·47
21	5·11	6·2	4·52	6·26	6·5	7·55
22	5·10	6·3	4·52	6 27	6·57	9 4
23	5 9	6·3	4·52	6·28	7·58	10·14
24	5·8	6·4	4 52	6·28	9·2	11·16
						p.m.
25	5·7	6·4	4·51	6·29	10·8	12·17
26	5·6	6·5	4·51	6·30	11·14	1·15
					p.m.	
27	5·5	6·6	4·51	6 30	12·19	2·11
28	5·5	6·7	4.51	6 31	1·22	3·8
29	5·4	6·7	4 50	6 31	2·22	4·5
30	5·4	6·8	4·50	6·32	3·20	5·4
31	5·3	6·9			4·16	

Phases of the Moon, Occultations, &c.

4 Oct.	○	Full Moon	3 7 a.m.
12 ,,	☽	Last Quarter	2 45 a.m.
19 ,,	●	New Moon	3 44 p.m.
26 ,,	☾	First Quarter	8 20 a.m.

Apogee, 10th October, at 2.54 p.m.
Perigee, 22nd October, at 10.24 a.m.

On the 5th at midday the Moon will be passing from west to east of Uranus, in Pisces, at a distance of 5 degrees.

On the 14th at 9 p.m. the planets Venus and Mars will reach the nearest point in their conjunction, Mars being only 1·2 degrees north of Venus. Both will be apparently amongst the small stars in the head of the Scorpion. In a week's time they will be more than 2 degrees apart.

(1) The Moon will be passing over Regulus, the principal star of Leo, between 1 and 2 p.m. on the 15th. Their position with regard to the Sun will detract from this as a spectacle for general observers.

(2) On the 16th the Moon will be passing from west to east of Neptune at a distance of 2 degrees and on the 18th at 2 p.m. from west to east of Jupiter at its south side, the apparent distance between the two being 5 degrees.

Antares, the principal star of Scorpio, will be occulted about 3 p.m. on the 22nd when nearly in the zenith at Gympie and within an hour later almost exactly overhead at Roma.

There will be an occultation of Sigma Sagittarii on the 24th after the Moon has set.

Mercury rises at 6.13 a.m. and sets at 6.55 p.m. on the 1st; on the 15th it rises at 6.17 a.m. and sets at 7.37 p.m.

Venus rises at 7.33 a.m. and sets at 8.49 p.m. on the 1st; on the 15th it rises at 7.35 a.m. and sets at 9.21 p.m.

Mars rises at 7.56 a.m. and sets at 9.26 p.m. on the 1st; on the 15th it rises at 7.38 a.m. and sets at 9.16 p.m.

Jupiter rises 5 min. before the Sun on the 1st and sets 13 min. before it; on the 15th it rises 36 min. before the Sun and sets 1 hour 2 min. before it.

Saturn rises at 1.42 p.m. and sets at 3.8 a.m. on the 1st; on the 15th it rises at 1.27 p.m. and sets at 1.53 a.m.

---

2 Nov.	○	Full Moon	5 59 p.m.
10 ,,	☽	Last Quarter	10 17 a.m.
18 ,,	●	New Moon	2 23 a.m.
24 ,,	☾	First Quarter	5 38 p.m.

Apogee, 7th November, at 9.42 a.m.
Perigee, 19th November, at 11.18 a.m.

The Moon will pass from west to east of Uranus, in Pisces, at 6 p.m. on the 1st, when the planet will be more than 5 degrees southward.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S. add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhat about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]